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November 6, 1920

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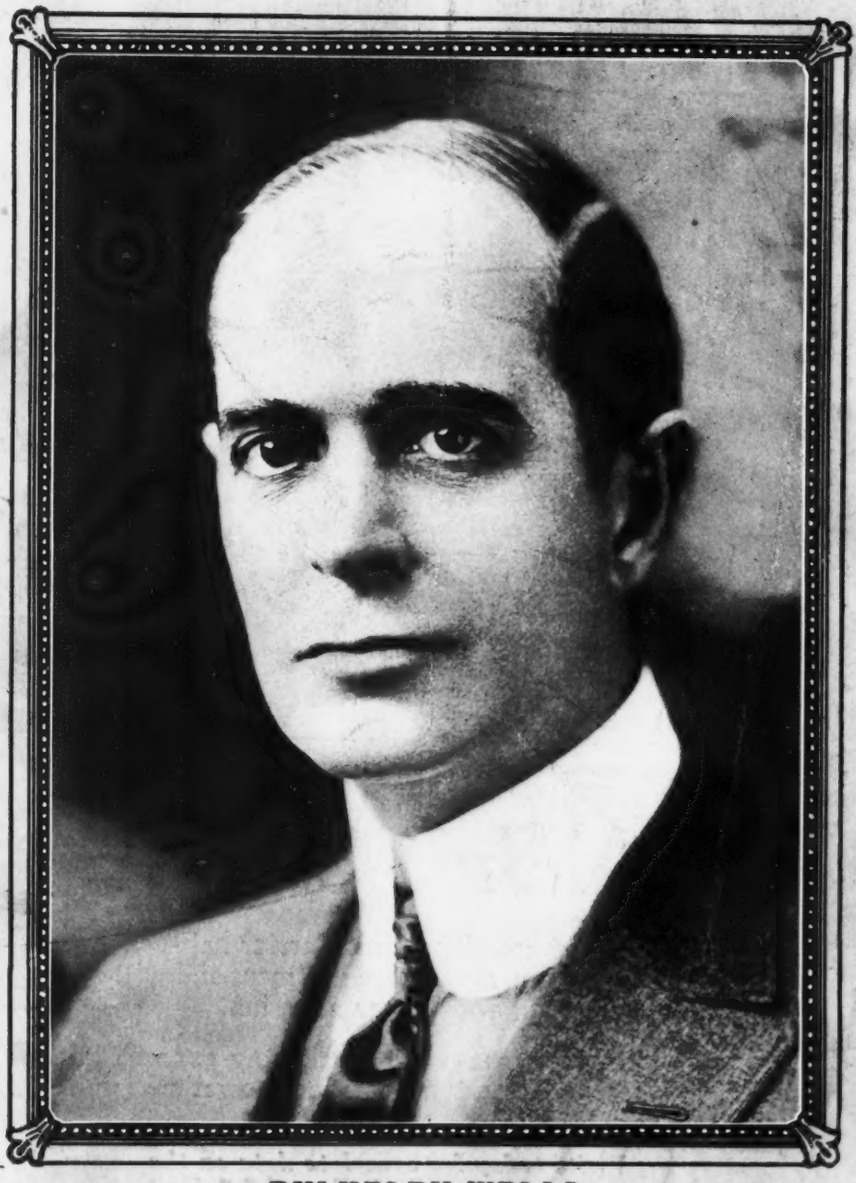


**BULKELEY WELLS**
President of the American Mining Congress

## *In This Issue:*

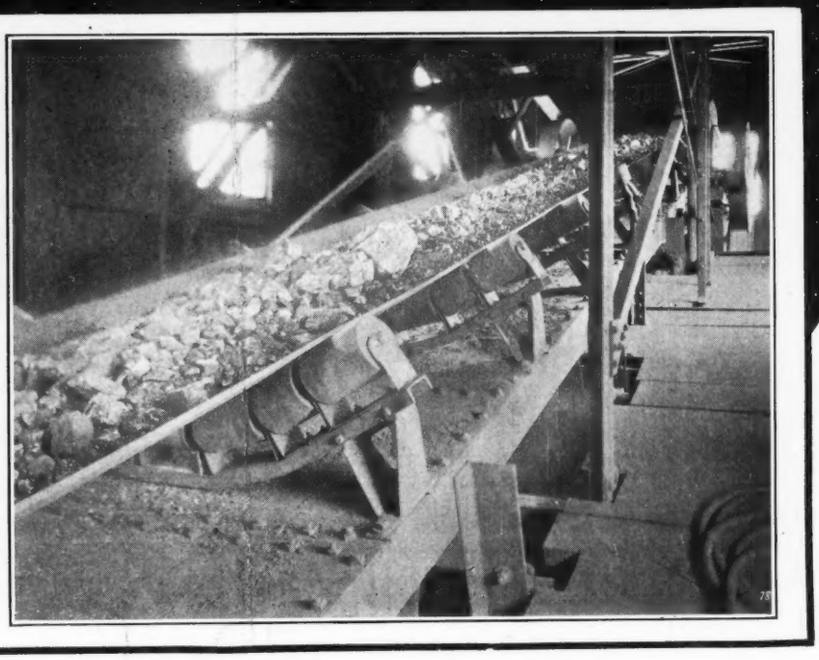
**Recovery of Silver from Manganese-Silver Ores**
By J. A. Carpenter

**The Experiences of a Custom Assayer**
By E. C. D. Marriage

**Stuck Steel**
By D. E. Dunn

**Biographical Sketch of J. F. Callbreath**
Secretary American Mining Congress

# Save Lubrication



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# Engineering and Mining Journal

*A Weekly Journal of the Mining and Mineral Industries*
METALS NON-METALS PETROLEUM

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*Volume* 110 **New York, November 6, 1920** *Number* 19

## The McFadden Gold Bonus Bill

THE statement of Congressman Louis T. McFadden, chairman of the Banking and Currency Committee of the House of Representatives, presented before the recent Forty-sixth Annual Convention of the American Banking Association in Washington, is printed in abstract on another page. We commend it as a sound and thoughtful discussion of fundamental monetary economics.

Concerning the advisability of a bonus to gold miners, as proposed by Mr. McFadden, the bankers are by no means in agreement—there are two mutually dissenting parties, as there are outside the banking world. Mr. McFadden's argument is directed against the report of a certain Gold Committee appointed by the American Banking Association, which rendered an adverse report on the bill; but this committee is held by the sponsors of the bill to represent a minority, and it is certain that some important banking interests remain so much in favor of the bill that they have included a statement of their support in their newspaper advertisements.

Now, the proposition, if it is to stand, and if it should stand, must be shown to be desirable, first and last, on the basis of national welfare. While we of the mining profession naturally have our own industry very much at heart, it would be not only unfair but suicidal if we should advocate any measure which, though it would rescue the gold-mining industry from disaster, would depress the prosperity of the rest of the country and delay the natural healing processes which supervene on the wounds of war. It is on this broad basis of national welfare and no other that the measure is presented, and on which we support it.

Those bankers who oppose the bill are misled in some cases, it appears, by some elementary knowledge of economics, proving anew that a little knowledge is a dangerous thing. Mr. McFadden, for example, combats the statement of the Gold Committee that "Increased gold production in a period of low prices and low costs makes it easier for prices to rise again, while diminished gold production in periods of high prices and costs tends to reduce prices and costs again."

Here, in a way, is a true and fundamental statement; and yet it is absolutely inapplicable in the present case. It is evident that with gold, or silver, or anything else, as a medium of exchange, the greater the supply of the standard, the cheaper it will become, and the less it will purchase; in other words, the prices of other commodities will rise in terms of gold or silver, as the case may be. This was illustrated by the discovery of the great Valenciana silver mine, in Mexico, in the sixteenth century: the flood of silver caused a rise of commodity prices throughout the civilized world. The absolute inapplicability of this law to the present world monetary conditions lies in the fact that our basis of exchange is now not gold and silver, but so-called money which is mostly paper with a minimum and quite insufficient security of gold and silver. Therefore, it is now and long will be the case that the monetary control of prices (there are, of course, other factors) follows the law that commodity prices will tend to increase as the ratio of paper to metal (gold) increases: that they will rise with inflation and diminish with deflation. Deflation means a diminished ratio of paper to gold; and there are two ways of accomplishing it—one by decreasing the amount of paper, the other by increasing the amount of gold. The latter is what the McFadden bill proposes to do.

A more astonishing economic view, urged by a great financier against the McFadden bill, was that it was inadvisable to increase the gold reserve, as that would mean more credit based upon the increased gold, and so further inflation! It is difficult to argue concerning this warped point of view, as it assumes the fundamental depravity of American bankers—which may or may not be true. Certainly, the financier who uttered this objection should know better than we; but, if so, the remedial castigation should be applied to our banking system. On this theory the way to induce deflation would be by reducing the gold reserve, and complete deflation would be accomplished with its disappearance.

Though we are not threatened with any situation so extreme as the condition of complete disappearance, apparently viewed with equanimity by our great banker, we are face to face with a shrinking gold reserve, which we can hardly escape. We can hardly expect stable return of prosperity till Europe again becomes a buyer as largely as of old. The present situation in copper is typical of this. Now, Europe cannot buy before her exchange depreciation is remedied—until then she has nothing to offer us. The slowing down of her purchases, however, increases the amount of her exports as compared with her imports, and, as regards us, this means that her balance of trade with us is being gradually adjusted, which means eventually a movement of our gold to Europe to adjust balances; and this is a tendency which will be healthy for the world. Against this the fact is that more gold is now going into the arts in this country—principally jewelry—than we are producing—so that our outstanding paper currency will tend to have a shrinking basis of metal security.

Our whole endeavor should be to build up the world's metal security underlying its paper notes. The McFadden bill could wisely be adopted in this country, and copied in all other gold-producing countries. It serves the double purpose of tending to increase the production of gold, and decrease the economic waste of it by turning it into purposes of adornment. The tax of ap-

proximately 50 per cent which the jewelers would have to pay is a moderate one. Considering the general problem of taxation for revenue, together with the McFadden problem of taxation for increase of gold reserve, we would be inclined to recommend a 500 per cent tax on gold and jewelry, of which 50 per cent would be turned over to the miners as a bonus, and the remainder into the Treasury to help meet the general expenses of government. We think that the McFadden proposition might well be modified so as to exempt from taxation gold employed for useful purposes, as in dentistry; this would further insure the retaining of the commodity standard of gold value as on the old fixed basis, and would, in addition, refute the charge of a change in the gold standard. But the hoarding of gold, especially in times of great financial stringency, is looked upon with disfavor by bankers; indeed, if the reader will ask for a single $20 gold piece from his bank, he will probably detect some disfavor or suspicion on the part of the banker; and it is nothing less than hoarding to suspend it around one's neck or across one's chest, or locked up in one's strong box as jewelry. Hoarding of this sort of silver and gold (as ornaments) in India has long made that country a veritable sink of the metals; and at the present time more than the total production of gold of the country is thus hoarded in this country, as jewelry. Will not the bankers view this also with the appropriate alarm?

## The Government Employee And His Discoveries

RECENTLY a meeting was held at the Chemists' Club in New York, under the auspices of the American Institute of Chemical Engineers, the New York Section of the American Chemical and American Electrochemical Societies, and the American Section of the Society of Chemical Industry, to hear Dr. Cottrell, Director of the Bureau of Mines, and Dr. Alsberg, Director of the Bureau of Chemistry, present their plan for solving the problem of discoveries or inventions by Government investigators. This plan is embodied in Senate bill 3,223, which has been passed by the Senate, and will go to conference in December. Briefly, it provides that inventors who are Government employees may be assigned to the Federal Trade Commission (subject to the acceptance by that commission), which may license such inventions, and collect fees and royalties therefor, out of which fees and royalties a certain per cent shall be set aside to remunerate the inventor.

The submission of the plan in New York met with the most plain and hearty disapproval of the important and representative meeting of chemists to which it was submitted, and the meeting and the proposal are discussed in a long and able editorial in *Chemical & Metallurgical Engineering* for Oct. 27, which aligns itself against the project.

We are inclined to join in the general reaction of dissent from the proposed plan. Though the problem of retaining able scientists in the Government pay is doubtless an important one, we do not think this is the solution, for this preventive remedy, we judge, is far worse than the disease. The effect, in our opinion, would be to subsidize scientists while they were working out inventions by which they hoped eventually to profit financially.

There is no use minimizing the spur and the bias given by the prospect of monetary reward, and if the Government should adopt this system we could not blame the employee for shaping his efforts in that direction. He would be in an enviable position—nothing to lose for the time spent in his researches, for the Government would support him comfortably and indefinitely, and everything to gain. We can imagine what a horde of hungry inventors, who have had experience in being on the losing side of the gamble, would apply for Government jobs!

Neither is the proposal to still further expand the powers and functions of the Federal Trade Commission likely to prove popular. This organization has already been accused of socialistic ideals, and the plan in question certainly trends in the direction of intensifying that paternal nursing by the Government which is called state socialism. The industries apprehend it as such, if we may judge from the very definite antagonistic attitude of the meeting to which we have referred. We believe that the plan is a dangerous and unsound one, and hope for the rejection of the bill by Congress.

## The Newer Branches of Engineering

JUST why it is we do not know, but engineering seems to be getting more popular. Perhaps it is the free advertising which Herbert Hoover has given the profession, or possibly the Federated American Engineering Societies is having some influence. But, anyway, an engineer is no longer considered one who runs an engine, just as a chemist is no longer merely a soda-water clerk.

The latest is Real Estate Engineering, or, as the pioneers in the profession call it, Property Management Engineering. This is the heading of an advertisement occupying the entire last page of the *New York Tribune* of Oct. 26. The advertisement goes on to say that engineers are scientists who know the facts about materials with which they work and who must not merely guess. They must also have the ability to put their knowledge to practical use. That is just the way the officials of the company running this ad. feel about the handling of real estate. Hence the title. They admit that the question as to what Property Management Engineering means has been asked them many times, and we do not wonder.

Julian Street, in his interesting little satire on the modern advertising man, just published under the title "Sunbeams, Inc.," follows the career of Mr. H. Bell Brown from newspaper reporter through his "'induction' into the profession of advertising engineering. It would seem that he was cut out for it. Either he learned with a speed hardly short of miraculous, or else advertising engineering may be mastered in a much shorter space of time than engineering in the commoner branches. Had he, for example, become an automobile engineer, a constructing engineer, or a civil engineer, instead of an advertising engineer, and progressed as rapidly, he would have been building motor cars, skyscrapers, steel bridges, or railroads within a year."

We are glad to see engineering becoming so popular, but we hope that the new-coming class will not totally supplant the old. No doubt Soup Engineering and Baked Bean Engineering will soon be featured in the advertising pages of our popular magazines. At present,

as is well known from the advertisements, our beans are baked by chemists, who analyze each bean as it goes into the can. Why wouldn't a good engineer be fitted to superintend the ovens, or, as they might be termed, roasting furnaces? Or even—but this is too much to expect—a good cook?

### The Wrong Kind of Immigrants

EMISSARIES from Soviet Russia with well-lined pockets are reported on good authority to be coming to this country. The immigration from former Russian territory, is, at least, becoming heavy, and it would not be at all surprising if agitators were slipping in despite the vigilance of the Federal authorities. The trouble in Italy, the seizure of many large factories, is, of course, Russian inspired, even if not actually financed, as alleged, by Soviet funds. The recent miners' strike in Britain probably has some foundation in Russian agitation.

We in America cannot watch too closely the character of immigrants which we are welcoming to solve our labor problems. Mining districts have been in the past a particularly fertile field for inspired discontent among foreign laborers, and it is unlikely that agitators will overlook them again should definite plans be made to stir up trouble. To secure the best efficiency, mining officials and others whose position gives them an insight into labor conditions should co-operate to the fullest possible extent with the Federal authorities. It is not enough these days to keep an eye on suspicious foreigners: they should be reported to the U. S. Commissioner of Immigration at Washington, that their history may be traced so far as is possible. In this way known trouble makers of national rather than local reputation may be more readily apprehended.

Communism in Russia seems to have been a very profitable undertaking for the group who are making misery for the rest of Russia, and it is to be expected that they will use money liberally to widen their field.

### Scientists and the Divining Rod

IN ANOTHER COLUMN will be found an account of the discussion at a meeting of the Royal Society of Victoria, in Australia, of the divining rod as a water finder. It is interesting reading. The general feeling of the meeting on the subject was the one we have before editorially expressed, that the divining rod, though often used in good faith, "was a subject for investigation on the part of the psychologist rather than the geologist." A number of experiments were cited indicating the cheerful and conscientious blundering around of divining-rod operators. Sometimes they struck water, sometimes not—exactly as if they had shot an arrow into the air and dug for water where it fell.

We recommend the study of the phenomena of the divining rod to a mixed committee of geologists and psychologists. A great deal of interesting data on the human mechanism would be the result; and the subject is well worthy of scientific investigation. Solid citizens —exceptionally solid and square-set on their feet—are credulous of this, as of all other wonders beyond their ken. They live by faith, for they really understand little of what is going on in this world.

We once watched an honest divining-rod operator who walked over a field, and his rod bent over with irresistible force when he passed over a certain kind of soil which he said he had assayed, and which ran $5 a ton in gold (his apparatus, we should have said, was "set" for gold, by slipping a gold bar into each of the handles). We noted with amusement the massive gold watch and chain which lay across the operator's breast, and the massive gold rings on his fingers, all of which fine gold did not affect the instrument that was convulsed by the supposedly $5 a ton dirt beneath his feet! Yet this evidence made no impression upon a lawyer and a banker who were present.

Therefore, to be complete, the study of the psychology of the divining rod should be extended to that of some of those who believe in it; and this would lead further on to the study of the similar firm basis of their other beliefs, and to the psychology of solid citizens as a whole. These are the types of men we observe going around the streets these days with their winter overcoats on, although for some days (as we write) the temperature has been above 80 deg. midday; but is it not after October the first, which is the one incontrovertible fact that these gentlemen grasp? They are of the solid supporters of society, who know quite firmly whether they are Republicans or Democrats, Baptists or Presbyterians: and what is right and what is wrong in general.

### The Chemical Wizard

PROF. F. W. CLARKE, chief chemist of the U. S. Geological Survey, whose great work "The Data of Geochemistry" has gone through several editions and revisions, is now engaged in making a study of the chemical composition of waters. He finds the mineral contents of waters from different rivers and lakes to vary widely, and to correspond in the proportion of the elements which they contain to the chemical characteristics of the rocks which underlie the drainage basins, and from which the mineral elements have been derived by solution. So close is this that when a notable exception was found in one instance, and the mineral elements of a certain stream were found not to correspond to those of the rock terrains over which its drainage flowed, according to the map, Dr. Clarke investigated with great interest this apparent exception to the rule. He found that the map was wrong and showed the stream in a wrong location; and the corrected location showed the usual chemical correspondence between stream and rock.

### On Making a Correction

THE total depravity of inanimate things is illustrated anew in the accidental misplacing of the tables and a transposition of headings on page 809 of *Engineering and Mining Journal* of this volume, in the article on "Mineral Resources of the Belgian Congo," in the Oct. 23 issue. Also the gold content per cubic meter of the Moto mine, in the same article, should have read 2.32 grams instead of 3.32 grams. The *Journal* wishes to make due acknowledgment to Mr. Sydney H. Ball for directing our attention to the matter.

Through a typographical error, on page 815 of the *Engineering and Mining Journal* of Oct. 23, Mr. Gilbert H. Montague was made to say in his article on the western hearings of the Minerals Separation case, "To make its demand for a 25-c. royalty effective, Minerals Separation . . . " This should have read, "To make its demand for a 12-c. royalty effective."

# WHAT OTHERS THINK

## Advantages of Alignment Charts

Permit me to refer to an article published in your issue of July 17, 1920, page 108, entitled "Charts for Computing Blast-Furnace Performances." This article discusses only the construction of the charts. The author evidently does not employ the alignment charts invented by M. D'Ocagne in 1884, which have advantages over rectangular co-ordinate charts for the plotting of equations with three variables.

I have at hand a catalogue issued by the Robins Belt Co., called "Handbook of Conveyor Practice." This shows, as a recent innovation, some charts used in substitution of many tables. This practice is valuable and ought to be followed by all manufacturers when presenting their products to the public; they need to give useful, definite data, which, if presented in tabular form, might occupy many pages of their catalogs, but when charted are in a very condensed and useful form. However, they should undoubtedly choose the system best suited to their needs.

In this system each variable is represented by one scale and the values which satisfy an equation of three

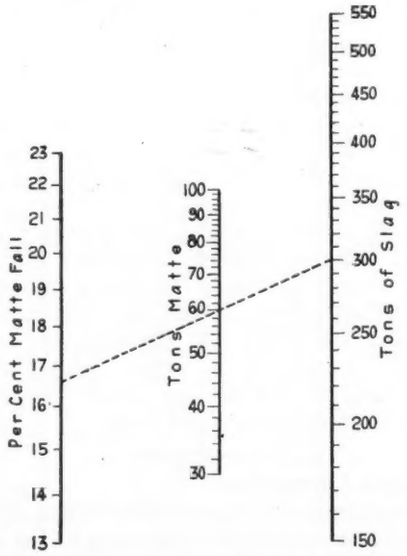



CHART FOR DETERMINING PERCENTAGE OF MATTE FALL

variables are always in a straight line. If one of the variables is the unknown quantity, it is only necessary to connect with a straight line the values of the other two variables and the prolongation of this line will intersect, in the scale, the corresponding value, which will solve the equation connecting the three variables. In practice, the straight line can be drawn with a lead pencil or indicated with a tightly drawn thread or by the edge of a rule or triangle.

To me the rectangular co-ordinate charts possess no other interest except historical; their construction is laborious, especially when curves must be drawn; the visual interpolation required to determine the approximate value of a variable is more difficult than on a scale, and the general aspect of the chart is confusing and similar to a cobweb.

I present for the consideration of your readers two charts of alignment scales which solve the same problems worked out by Mr. Ficket in order to show the greater simplicity obtained. For their construction the following data should be furnished: (a) The formula

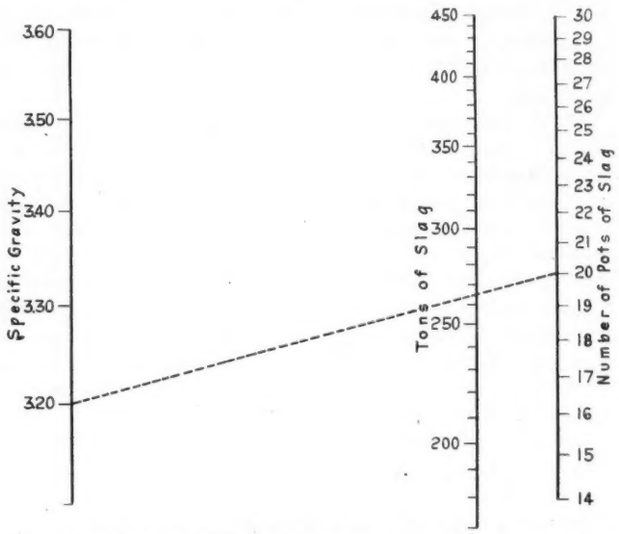



CHART FOR COMPUTING WEIGHT OF BLAST FURNACE AND REVERBERATORY SLAG

which connects the variables of the problem. (b) The limits within which the variables will be used. (c) The degree of accuracy which it is desired to obtain.

Pachuca, Hgo., Mexico. ABEL VALADEZ,
Santa Gertrudis Mine.

## Turbo vs. Reciprocating Compressors

In Mr. Bancroft Gore's article entitled "A New High-Speed Turbo Compressor," appearing on page 717 of your Oct. 9 issue, he makes the statement, "Although the turbo blower, for capacities considerably in excess of these requirements, has generally supplanted cumbersome steam-driven reciprocating units, considerable difficulty was found in placing the order for the machine shown herewith." The capacity he refers to for his requirements is 4,000 cu.ft. per minute. I believe this statement is misleading.

I know of only four copper-smelting plants in the West in which a steam-driven turbo compressor has been installed for supplying air to copper converters. These compressors are rated at from 20,000 to 30,000 cu.ft. per minute, and deliver air at a pressure of from 11 to 16 lb. per square inch. At three of these plants the turbo compressors were shut down after operating only a short time, on account of their high steam consumption. At the other plant waste-heat steam is used for driving the turbo compressor, and the waste-heat steam is in competition with low-cost hydro-electric

power; however, the turbo compressor is operated only during the summer months, when there is no excess of waste-heat steam.

In two of the plants new reciprocating steam blowing engines have been installed since the turbos were installed, so that the latter may be kept shut down except for emergencies.

It appears from Mr. Gore's graph that his compressor, when working at its rated capacity of 4,000 cu.ft. per minute at 15 lb. pressure, requires about 4,600 lb. of steam per hour at 150 lb. gage and 100 deg. F. superheat and with a vacuum of 4 in. absolute and barometer reading 28.1 in. This is equivalent to 1.92 lb. of steam per 100 cu.ft. of air delivered, or, at 30 in. barometer, it would be about 1.94 lb. of steam. Under these air and steam conditions I would expect a good reciprocating engine equipment of this capacity to deliver 100 cu.ft. of air from 1.25 lb. of steam. A larger reciprocating unit would do better. Also, larger turbo conpressors, when working at their rated capacity and with high vacuum, will more nearly approach the performance of reciprocating blowing engines. However, the economy of a turbo falls off rapidly at loads less than its rated capacity, whereas a reciprocating blowing engine maintains its economy fairly uniformly over a wide range in capacity.

The turbo compressor has advantages, as pointed out by Mr. Gore; however, for furnishing air for copper converter plants, where the amount required usually varies widely, and when the cost of generating steam is of consequence, it will often be found that these advantages are not of sufficient importance to be worthy of great financial consideration. A. G. McGREGOR.

Warren, Ariz.

## The Cave Creek District, Arizona

I have just finished reading an article on the Cave Creek District, north of Phoenix, by Mr. Lewis in the *Engineering and Mining Journal* of Oct. 9. I made an examination of the Red Rover mine for the owner, Frank A. Gillispe, in September, 1920, going into the geology of this deposit in great detail, and I believe that Mr. Lewis is mistaken in his analysis. I will quote from our report.

"*Geology:* The Red Rover mine is situated in an area of sedimentary rocks which have been intruded by a dark greenish diabase and is overlain in part by a thick flow of rhyolite.

"To the south of the Bridal Chamber on the opposite side of the gulch is a granitic schist which has a strike of N 40 deg. E and dips 52 deg. to the north. Upon this granitic schist lies a series of sedimentary rocks. In order from the granitic schist upward and to the north they are red to brown sandy slate showing much jasper, a sandy slate, a white crystalline limestone, a sandy slate, a white crystalline limestone, a variegated brownish limestone, a sandy slate, arkostic sandstone, slates, a conglomerate and a highly metamorphosed slate. Under ground part of these same sedimentary rocks are found, and in addition there is a large area of a dark greenish diabase which has been introduced.

"In the vicinity of the vertical shaft the sedimentary rocks are covered by a rhyolithic flow which forms in a half moon to the south of the shaft. The surrounding mountains are capped with a heavy basaltic flow.

"The granitic schist has the appearance of having been faulted against the sedimentary rocks. The sediments show the effect of great pressure which has produced a schistosity in all of the sediments which has an almost vertical dip and strikes to the northeast. The sedimentary rocks have all been very much metamorphosed by the compressive force.

"*Orebodies:* The principal orebodies occur in a fissure which follows very closely a stratum of crushed variegated limestone. With the exception of a short distance near the west end of the ore drift south of the shaft on the 500-ft. level, the hanging wall of the ore is the bedding plane of a fine-grained sandy slate which overlies the variegated limestone, and the foot wall of the ore is a white crystalline limestone. In the vicinity of the ore the crushed variegated limestone is completely silicified. On the surface the diabase is seen in contact with the ore to the west of the inclined shaft."

The orebodies are some distance from the granitic schists and have no connection with them.

Los Angeles, Cal. RUSH T. SILL.

## Boxite or Boozite

As an early contributor to *Engineering and Mining Journal*, in fact as long ago as 1883, I feel that I want to enter a protest against the use of its columns as a means for disseminating the principles of the proper use of language.

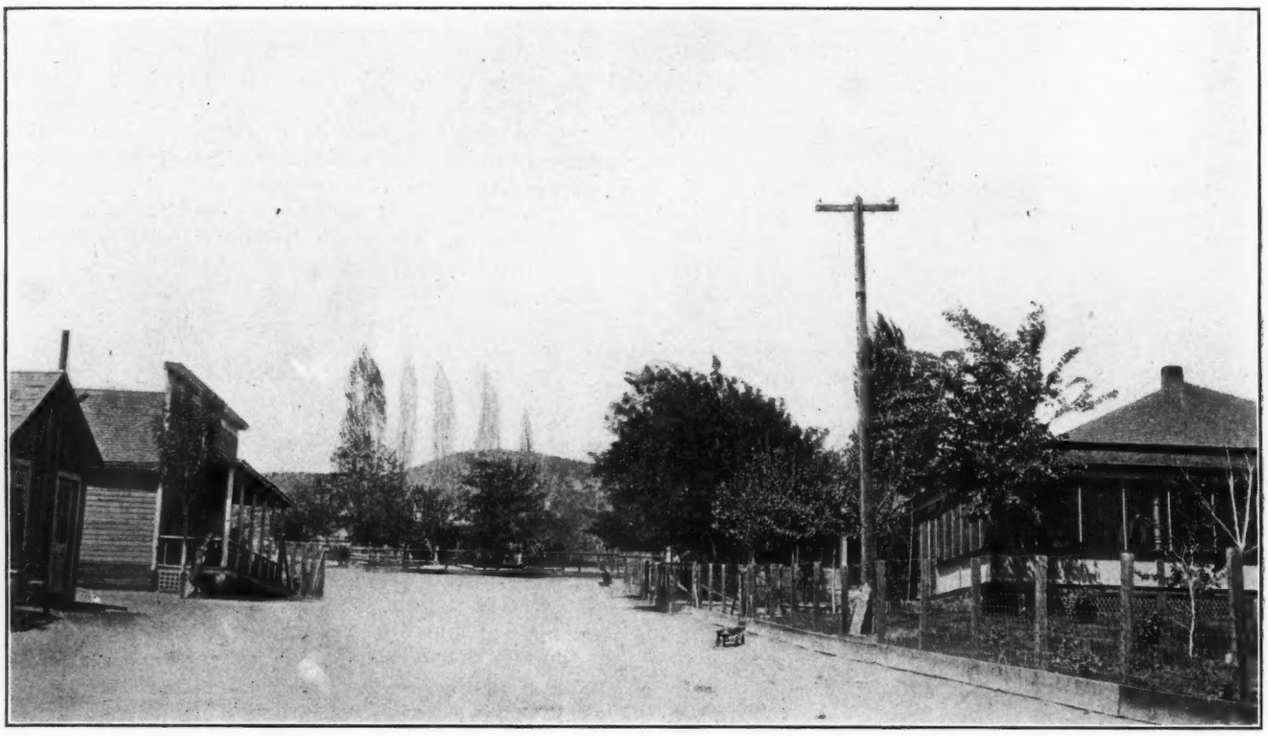
In the issue of Oct. 2 your correspondent, and with the well-chosen pseudonym (for we all know how light of weight is aluminum), takes a whack at the philologists by interrogating their authority. Unfortunately, he apparently does not know that bauxite, or beauxite, is not, I believe, found at Bozeman, Mont., although corundum is, nearby: that this hydroxide derives its name, not from Bozeman, Mont., but from the original locality, Baux, near the old Roman town of Arles, southern France, and that most, if not all, of the authorities (and I do not add an inclosed interrogation) agree that the mineral be pronounced as is the name of the French locality, with the added *lithos* or ite. I never could understand how box could come out of baux or beaux.

He then adds: "But who ever heard it called that? Why, even professors of mineralogy," etc. Well, I have very generally heard it pronounced correctly. To be sure, I have also heard boxite, but by a very few persons who are not supposed to know better, and hence were excusable. However, my preceptors of years ago pronounced it as indicated by Murray, the Standard, the Imperial, et al., wherein I appear to have been more fortunate than Al. U. Minum. And it was never my misfortune to have my teachers make lapses in English like e. g. "Ain't it fine?" but I am told that there are some guilty ones even today. But Al. U. Minum does not in his communication venture to tell us how he pronounces bauxite.

I refer your correspondent to my article in the New York *Sun* of Nov. 23, 1919, and if he really is in search of some "choice bits" of deviation from the straight and narrow path of good English, to the Cleveland daily papers. JOHN EYERMAN.

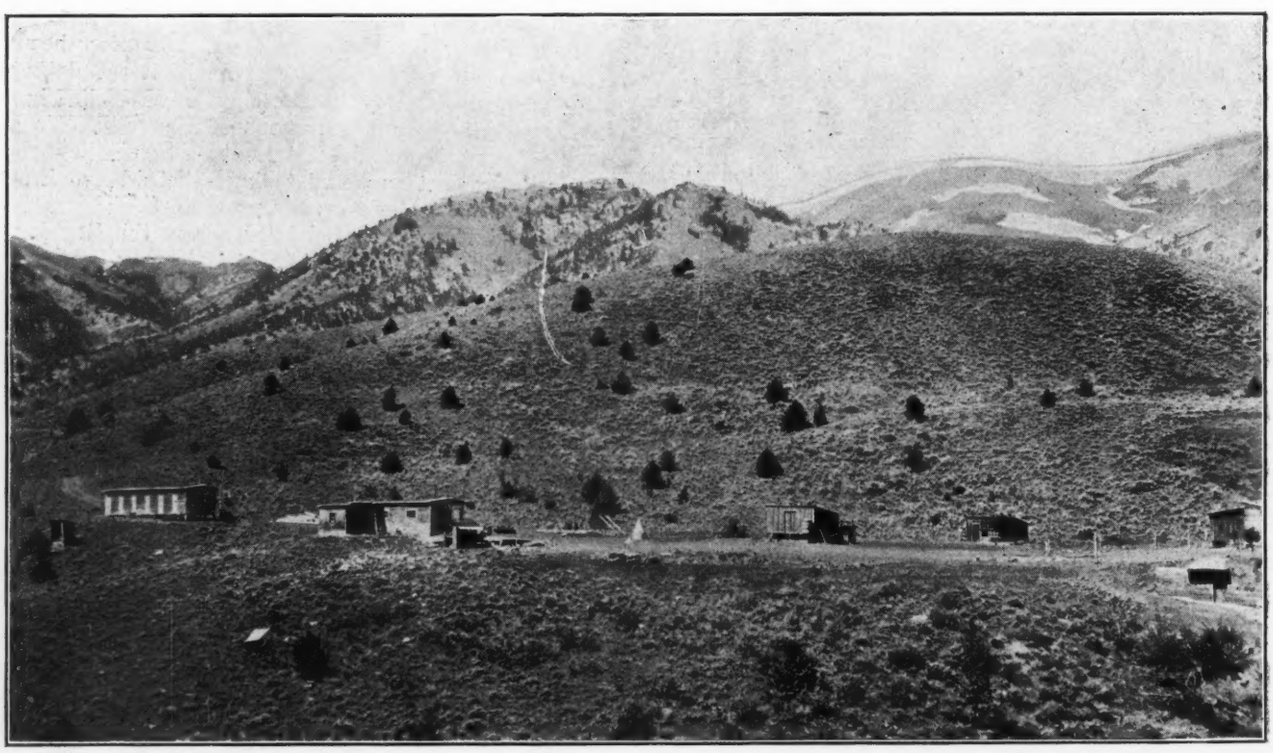
[The derivation of the word bauxite has been familiar to us since our earliest infancy, and we are perfect in French, as in all other languages; yet in America we (ourselves) pronounce it "boxite." We like to make ourselves intelligible, and the Anglicization of the pronunciation of words of foreign origin is an established linguistic principle. The discussion is closed.—EDITOR.]

# Trailing Out of Murphy, Idaho

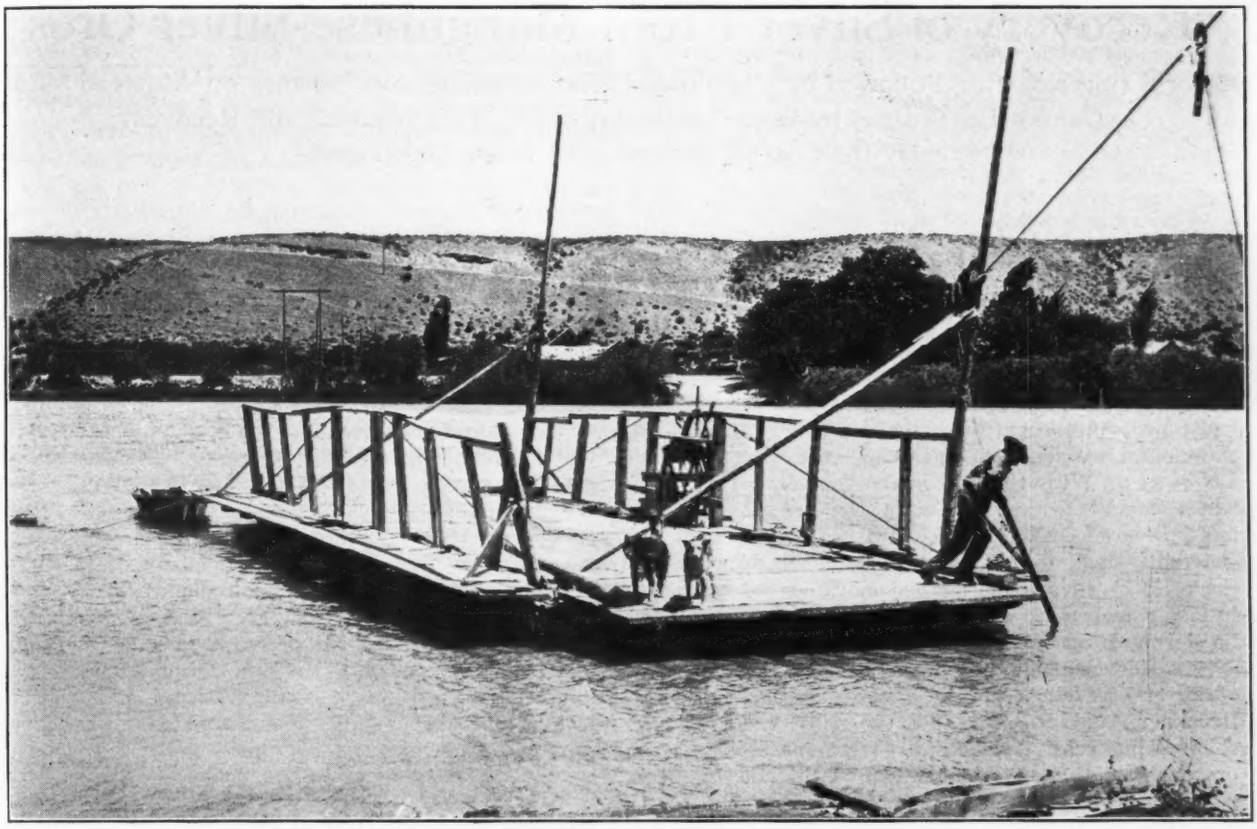


MURPHY, IDAHO, IS THE SHIPPING POINT FOR THE DEMING MINES CO.

The property of the Deming Mines Co. consists of thirty-eight claims and is situated about forty miles southwest of Murphy, Owyhee County. The ore is sulphide and carries gold and silver. Considerable new development has been done. The equipment, in addition to a hoisting and compressor plant, consists of a 100-ton mill provided with ball mill, six-cell Janney flotation machine, Senn tables, Oliver filter, roasting furnace and cyanide plant. The property is temporarily shut down pending re-financing.



HALF-WAY STATION ON FORTY-MILE WAGON ROAD BETWEEN MURPHY AND THE DEMING MINE



ON THE TRAIL FROM MURPHY. THE FERRY ACROSS THE SNAKE RIVER. SUPPLIES ARE TAKEN IN AND CONCENTRATES BROUGHT OUT

PART OF THE FORTY-MILE WAGON ROAD BETWEEN MURPHY AND THE DEMING MINE. TRANSPORTATION OF SUPPLIES AND CONCENTRATES IS BY MOTOR TRUCK

# Recovery of Silver From Manganese-Silver Ores

## Chloridizing Roasting Followed by Cyaniding Offers Considerable Promise on Material Which Cannot Be Treated by Less Costly Processes—Volatilization and Recovery By the Cottrell Process Also Being Developed

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IN PRESENTING a method of treating certain refractory manganese-silver ores by chloridizing roasting followed by cyaniding, it is necessary to state that it is simply the combination of two well-known metallurgical processes that in the last two decades have had the disadvantage of high loss of silver by volatilization and too high an operating cost with silver at low prices. With the steady development of roasting furnaces and pyrometers, with the use of crude oil and powdered coal as fuels, with the invention of the Cottrell system, and, lastly, with the marked increase in the price of silver, this method may now be applicable to silver properties with refractory ore that at present lie dormant.

Rapid development has taken place in the treatment of silver ores since the days of Hofmann, Stetefeldt, Brückner, and Russell. In the 60's and 70's the chloridizing roast, followed by the hyposulphite leach or amalgamation, was the accepted method of silver recovery from ores of too low grade to smelt. With the drop in the price of silver this low extraction method became impracticable. Starting with the new century came the application and intensive development of the cyanide process to the treatment of both oxidized and sulphide silver ores. This process, alone or in conjunction with table concentration, treats successfully nearly all silver ores that carry little of the interfering base metals.

### ECONOMIC LIMIT OF FLOTATION

In the last five years the flotation process has solved successfully the problem of treating base silver ores in which the silver occurs in the form of a sulphide along with copper, zinc, or lead sulphides. Just as the ambitious cyanider of fifteen years ago found to his sorrow that cyaniding had its limits when applied to manganese silver ores, so the flotation expert of today is learning that flotation has its economic limit when applied, with sulphidizing, to treat oxidized silver ores. Low extraction and erratic results will probably limit this combination to sulphide ores with a very small oxidized content.

The combination of the cyanide process with a reducing process successfully solved the treatment of Nipissing low-grade silver ore, in which the silver was combined with arsenic and antimony in refractory sulphides. There still remains to be successfully demonstrated, however, a practical way to treat the refractory manganese silver ores and the oxidized ores of silver combined with copper, lead, and zinc.

### TWO AVAILABLE METHODS FOR TREATING MANGANESE SILVER ORES

Two proposed methods of treating the manganese ores are about to be tried out in operating plants. The older one is that of giving the ore a preliminary wet treatment with $SO_2$ gas, to reduce the refractory oxidized silver compounds. This method should prove successful where the $SO_2$ can be made cheaply and where it would not be destroyed by carbonates in the ore. The other method is that of giving the ore a reducing roast before cyaniding, and can be applied to ores containing carbonates. The success of this process will depend on the type of the roasting furnace, and the operating care given the roast, as silver oxidizes very readily to compounds insoluble in cyanide. It will probably solve the treatment problem of certain manganese silver ores, but not all, as many of these ores are benefited but little by a reducing roast and a few are made more refractory. Skilled metallurgists worked on the treatment of oxidized silver ores combined with copper, lead, or zinc without success, and it was only because of a rapid rise in the price of metals that the practical metallurgist ventured to try roasting as an aid to the problem.

### THE CHLORIDIZING ROAST

As the silver is locked up in an insoluble form by an oxidizing roast, it was natural that the line of attack lay in a chloridizing roast. The process of preliminary chloridizing roasting as applied to oxidized lead ores, before brine or acid leaching, was carried out in plants in Utah with small volatilization loss and with fair success, owing to cheap salt and fuel. However, with strictly silver ores there was still the drawback of the loss of the metal by volatilization of the chlorides. In the silver plants of the 60's this loss usually amounted to from 10 to 25 per cent of the silver content. It is true that early in the first decade of the present century came the idea of driving off all the metals as chlorides and catching them in specially constructed dust chambers, but one such commercial plant proved a failure.

### THE IMPORTANCE OF THE COTTRELL PROCESS

The development of F. G. Cottrell's remarkable and simple method of collecting dust and fume revived this process. Volatilization, which was the difficulty in the chloridizing roast in the 60's, is now relied upon to recover all of the silver, copper, and lead as volatile chlorides, giving the roasted ore as a tailing product. The Western Precipitation Co., of Los Angeles, controlling the Cottrell patent, is doing a great deal of experimental work with special reference to gold- and silver-bearing copper carbonate ores in a limestone gangue. The U. S. Bureau of Mines, at its Salt Lake station, has done and is doing much valuable work on the application of the process, especially to lead ores.

Small-scale tests have demonstrated that over 90 per cent of the gold, silver, copper, and lead in oxidized ores can be recovered as a chloride fume by this method. The fuel and chemical consumption and other details of treatment in these tests have been such as to give hopes that the process can be made commercially

successful on low-grade ores where fuel and salt can be delivered at a reasonable cost for freight charges. The process is fortunate in that the mechanical details of chloridizing roasting and recovery of the fume by the Cottrell system and its reduction by fusion appear to offer no serious difficulties. The scope of the process depends principally upon the oil consumption per ton of ore, not only to chloridize the ore but also to maintain the necessary temperature at which the large stream of heated air gradually picks up and carries off the chlorides from the roasting furnace to the collectors.

### Application of Chloride Volatilization Process

The vapor pressure of silver chloride is probably considerably less than either that of gold, lead, or copper, and this accounts for its slower recovery by this method. Hofmann, in his "General Metallurgy," states that silver chloride alone is non-volatile at red heat, but is carried along with the more easily volatilized chlorides. From this it would seem that the chloride volatilization process opens a new field for the treatment of oxidized copper and lead ores carrying silver and occurring in a limestone gangue, but that it is not well adapted to the treatment of ores containing silver only. However, its development is rapidly increasing available knowledge of chloridizing roasting and the recovery of volatilized chlorides, and suggests the possibility of treating refractory silver ores containing no copper by a chloridizing roast at just high enough a temperature to chloridize the silver, and recovering the volatilized silver by the Cottrell system and the major portion by leaching the roasted ore with a weak cyanide solution.

A CREW OF TONOPAH CYANIDERS

From Hofmann's "Hydrometallurgy of Silver" I condense the following information:

Chloridizing roasting was usually applied to complex sulphide ores, although in some cases ores free from sulphides were successfully roasted. The object of the roast was first to oxidize the sulphides, then chloridize the metals, and then, if followed by amalgamation, to drive off the base-metal chlorides by volatilization. In the first part of the roast the sulphides burned, forming sulphates, which then reacted with the sodium chloride to give chlorine and metallic chlorides. The iron chlorides did not volatilize, but gradually oxidized, releasing chlorine for the chlorination of the other metals. The copper, lead and zinc chlorides volatilized readily, whereas the silver chloride did not, the quantity volatilizing depending on the amount of the other metal chlorides volatilizing and upon how high the heat was carried. Arsenic and antimony volatilized rapidly as the oxides before chlorine was released, and the balance went off as chlorides. If the ore contained gold, a considerable portion of it was lost as a volatile chloride, and the balance left as metallic gold, making amalgamation necessary.

The action of quartz in the ore was indifferent until at high temperature it decomposed salt, giving chlorine and sodium silicate. Clay, slate, and gypsum were inert. Lime rock acted unfavorably, as it decomposed metallic sulphates and chlorides to give calcium sulphate and chloride, thus consuming much salt and preventing the complete chlorination of the silver.

In general, the ore was crushed coarse in order to leach after roasting. To it was added about 5 per cent salt, and it was roasted with wood as the fuel in various types of furnaces, including the Brückner, Stetefeldt, and Howell-White. The metallurgists varied the degree of heat, length, and time of roast, the amount of air used, the time of adding, and the amount of salt, all according to the composition of the ore and their ideas of the process.

The roast took several hours, the dusting losses were heavy, and the volatilization loss of silver high. The consumption of fuel was low on heavy sulphide ores but high on oxidized ores unless a Stetefeldt furnace was used to bring the ore in direct contact with the flame. However, Hofmann states from his own experience that if he used a thick bed of ore, lots of air, and a low heat, the fuel consumption could be kept low and that the loss of silver by volatilization could be reduced to as low as from 2 to 5 per cent.

When the difficulties of maintaining an even heat with wood as a fuel are considered, and the unreliable method of judging temperature by the color of the furnace, the difficulties under which these metallurgists worked to find and maintain the best conditions readily can be appreciated. After sampling, in great anticipation, a couple of tailing piles of roasted silver ore in Nevada, I have come to the conclusion that they succeeded very well in removing the silver from the ore.

I do not know how much of the silver went up the roaster stack, but they were aware of this loss and worked hard to prevent it. In contrast to this is the fact that nearly all of the work in the present century on the chloridizing roast has been to get the silver to go up the stack. The pioneer in the work is Stuart Croasdale, of Colorado, who, in 1903, carried out successful experiments and patented the process. In 1906 a large plant, based upon the experimental work, was erected at Mayer, Ariz. Cement kilns were used for roasting and specially designed dust chambers to recover the fume. As is usual with a new process, much was written about the plant and what it would do. Later, the work of Christianson and Holt in chloridizing lead ores, and the invention of the Cottrell collectors, stimulated new interest in the process, and in 1917 the Bureau of Mines station at Salt Lake City, under O. C. Ralston, published the results of a great deal of experimental work.

Speaking of the volatilization of silver, Ralston states that in a reverberatory furnace treating an oxidized lead ore, with one hour's treatment at 900 deg. C., all the lead and copper are volatilized, leaving 10 to 20 per cent of the silver. The zinc volatilization varied greatly, being from 5 to 75 per cent. Concerning sulphur, he states that over 2 to 3 per cent in the ore gives lower silver volatilization recovery. His conclusion was that oxidized lead-silver ores can be chlorinated at 600 deg. C. and then successfully leached, or at 900 deg. C., and the metals recovered as a fume.

However, a working plant based on this experimental work was erected by a mining company at Eureka, Utah, the history of which is similar to that of the Mayer plant of eleven years before.

### Recent Work on the Volatilization Process

The Bureau of Mines is still working on the problem, having recently made a working test at the Yellow Pine mill at Goodsprings, Nev., on the volatilization of silver and lead from a zinc carbonate concentrate. Another working plant under the direction of Robert H. Bradford is about to start up at Salmon, Idaho, to treat a copper ore. A subsidiary of the Western Precipitation Co. has a small plant at Humboldt, Ariz.

With so many working on the process, and with the failures of the past as a guide, there is a good chance for success, for the problem is mainly that of reducing the fuel and chemical consumption. The Bureau of Mines did not publish the percentage of recovery of the volatilized metals, but with ample collector capacity it is stated that from 95 to over 99 per cent are recovered.

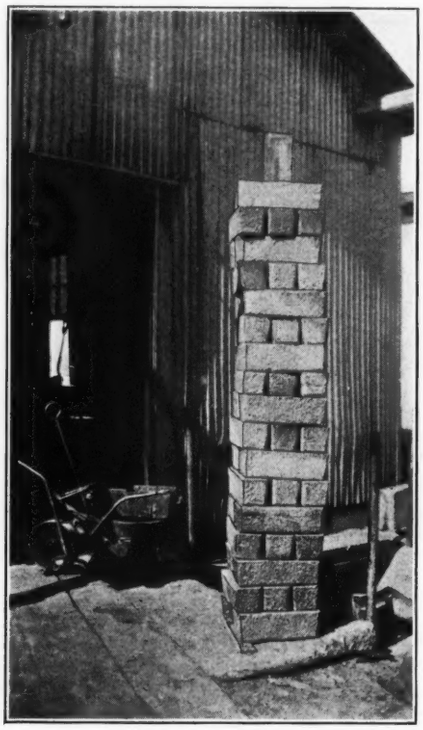
From a chemical standpoint present-day chemists have not added much to the improvement of the chloridizing roast, the principal improvements being mechanical. The best chemical improvement is the addition of calcium chloride along with the sodium chloride, a change which undoubtedly speeds up the chlorination, with a consequent saving of fuel. To melt down the fume, producing calcium chloride as a slag, is also an advantage. The present-day investigators have found, contrary to the old idea, that zinc is very slow to volatilize, and that limestone in the ore is generally beneficial to chlorination. Although the mixing of ores to prevent sintering has been given some attention, nothing has been published about it, or about the design and control of the furnace, or other ways greatly to increase or reduce the temperature of chlorination and the speed of volatilization, all of which are now the weak points of the process. The Cottrell system, by not only recovering the volatilized metals but also the volatilized sodium and calcium chlorides, has come to the rescue of the chlorination roast of silver ores.

### Benefit of Fine Grinding

The silver metallurgist who knows the ease with which a silver chloride is cyanided is naturally inclined to believe that with a refractory manganese-silver ore containing no copper it is unnecessary to attempt to drive off the silver as a chloride when it can be recovered as a metal cheaply by a well-tried process.

The silver of a raw silver chloride ore goes into solution in a weak cyanide solution very rapidly, and the time and percentage recovery are usually dependent upon fine grinding. A minimum of agitation and aëration is required. Sodium cyanide dissolves more than its own weight of silver, adding harmless sodium chloride to the solution. On precipitation with zinc, the double zinc cyanide formed under reducing conditions is an excellent solvent for silver chloride under oxidizing conditions in the agitators. At a mill that I operated, treating a silver chloride ore, the actual consumption of cyanide was less than the theoretical amount of new cyanide required to dissolve the known weight of silver. This, taking in consideration also the mechanical loss of free cyanide from the plant, indicated that the same cyanide molecule must have been combined several times in rotation with silver, then zinc, then silver, and so on. On recent experiments with a raw silver chloride ore containing zinc carbonate, solution used for the sixth time showed as low a cyanide consumption and as high an extraction on the ore as when used the first time. The reason is that the solution remains free from soluble sulphides, sulphocyanides, and the like. Such ores are usually well oxidized, which aids the solution in remaining fresh and active.

Freshly precipitated silver chloride is apparently as quickly soluble in cyanide solution as salt in water, as one notices when titrating a cyanide solution containing sodium chloride in solution with the standard silver nitrate solution. As long as there is a trace of cyanide, the cloud of silver chloride formed by the rapid addition of the nitrate disappears almost instantly. Titrating with Aero cyanide shows the same action.



A TOWER OF SILVER

It is thus easy to understand how quickly the freshly formed silver chloride from a chloridizing roast of a silver ore goes into solution in a cyanide solution. With such a roasted ore I have obtained with a 0.75-lb. NaCN solution an extraction of 50 per cent in one minute, 75 per cent in five minutes, and the maximum extraction in one hour. Zinc in the roasted ore will do no harm, because, if it forms any double zinc cyanide with the free cyanide in the solution, this compound still remains an active solvent for the silver chloride. With the sulphur removed from the ore by the roast, and the iron thoroughly oxidized, the contact of the ore with the solution tends to oxidize instead of reduce it, thus promoting extraction.

Comparing this with the loss of cyanide and lack of dissolving efficiency of cyanide solutions working on silver sulphide ores so well discussed in E. M. Hamilton's "Manual of Cyanidation," one can appreciate the simplicity and cheapness in cyaniding a silver ore that has been given a chloridizing roast. From a mechan-

ical standpoint the roasted ore is coarse enough to leach readily. The wider one's acquaintance becomes with the cost and difficulties of the modern all-sliming mill, the more he will appreciate this brief statement.

The question arises as to what effect the continuous accumulation of soluble chlorides in the cyanide solutions would have on the extraction or precipitation. The answer, without detailed operating experience, would be that ocean water has been used as the source of supply for cyanide plants. The American Cyanamid Co. states also that Aero brand cyanide contains 43 per cent of soluble sodium and calcium chlorides and that it is used in one mill at the rate of 278 lb. per ton of ore on 3,000-oz. silver ore, with the barren solutions retained in the circuit, and "no fouling occurs." However, if the soluble chlorides should give trouble, or their recovery would be of economic value, they could be leached off as a strong brine before cyaniding, to be used in whole or part as a solvent in the Cottrell system and then to dampen the ore going to the roaster, and thus furnish chlorides for the roast.

### Short Treatment at 900 Deg. C. Gives Good Results

From my test work on several oxidized refractory silver ores I have drawn a few general conclusions as follows: A temperature of about 900 deg. C. is necessary to get a high chlorination of the silver. The time of roasting at this higher temperature is short, being only thirty to forty-five minutes. Sulphide ores do not give better results on silver chlorination at lower temperature than oxidized ores, which is contrary to Hofmann's results from practical experience, but agrees with Croasdale's idea of the efficiency of the action of silica in freeing chlorine from salt, and of the Bureau of Mines' statement of the efficiency of volatilized sodium chloride as a chloridizer. With an oxidized ore the presence of carbonates appears to be beneficial, probably from the fact that they retain the chlorine down in the ore bed as chlorides, releasing it slowly with rising temperatures. Hofmann, in his "General Metallurgy," states that lead, zinc, and iron carbonates decompose when the temperature reaches 400 deg. C., manganese and magnesium at 600 deg. C., whereas calcium requires 900 deg. C. However, I believe the reaction between limestone and salt starts considerably below this temperature, as an ore with considerable limestone in it showed no contained carbonates after roasting at less than 900 deg. C.

Calcium and magnesium chlorides appear to react and volatilize faster and at a lower temperature than sodium chloride. I cannot, however, agree with Haria R. Layng that they are so much superior to sodium chloride as chloridizing and volatilizing agents. In fact, on oxidized silver ores I have been unable to make a high volatilization recovery of the silver with either of these chlorides or with sodium chloride, with a temperature of over 1,000 deg. C. for one hour, with rabbling and a fairly strong current of air.

### The Treatment of Mined Gold and Silver Ores

Gold volatilizes more quickly than silver, and on a certain refractory oxidized silver ore carrying 0.5 oz. gold and 10 oz. silver which was chlorinated several times at 900 deg. C. for forty-five minutes, approximately 40 to 50 per cent of the gold volatilized, whereas the silver showed no measurable loss. This was rather exceptional, as with another ore containing no gold but the same amount of silver, and chlorinated under the same conditions, approximately 10 per cent of the silver volatilized. The total percentage of silver chlorinated under similar roasting conditions apparently varies rather directly with the silver content, for with a 40-oz. ore the tailings after cyaniding showed an extraction of 95 per cent, whereas with a 5-oz. ore it was only 80 per cent. However, the cost of the chloridizing roast limits it to 10-oz. ore or better.

From a manipulation standpoint it is easy to determine when the salt melts, when the sulphides burn, when the chlorides start to come off, and when the chlorine is about exhausted. When a stream of warm air is directed over the roast the volume of fume is increased many times, but there is little difference in the total percentage chlorinated, although considerable difference in the amount volatilized. However, contact with air is necessary, as roasts without rabbling gave poor results. On roasts similar except in the use of calcium chloride instead of sodium chloride, the chlorine fumes started at a lower temperature and were much heavier, but diminished to a small volume in very much less time. This proved the value of a mixture to maintain uniform chlorination with the minimum amount of chlorides. Refractory manganese-silver ores contain silica and iron oxides, and usually calcite or limestone. Care must therefore be taken, if the temperature is raised to 1,000 deg. C. to drive off the chlorides, that the ore does not sinter and thus lock up the silver compounds, preventing chlorination as well as volatilization. Steady rabbling of the ore, and fluxing it to change its composition, will aid somewhat. These observations on the roast are given in detail to aid anyone who wishes to experiment. In my work I use for preliminary experiments 400-g. portions of ore, using as the roasting dish a 6 x 12-in. muffle cut away at the top, and making the roast in a large muffle furnace with auxiliary gas burners, air hoses, and complementary appliances.

### Only Coarse Crushing Necessary

In the practical application of the process of chlorinating and cyaniding refractory manganese-silver ores, the ore would be crushed to only 4 or 20 mesh. In out-of-the-way places with wood as a fuel it would be roasted in charges in Brückner furnaces. Where fuel oil or coal can be obtained, the choice would lie with a continuous rotary kiln, or a furnace with horizontal hearths if it would stand the heat. The Cottrell collectors can be placed in the stack flues, or individual units used, or they may be built of wood, as at certain cement plants. The size of the installation is remarkably small, and the amount of power required surprisingly low. A simple leaching plant would cyanide the roasted ore, and the same refining furnace would treat both the zinc precipitate and the silver chloride, giving silver bullion as the final product.

The reduction in cost of the simple crushing and leaching plant over that of an all-slime plant should go far toward balancing the cost of the roasting furnace. The economy in power and labor should balance to a large extent the extra cost of supplies, which would be largely for fuel and salt. Where these can be delivered at the reduction plant without high freight charges, it may be possible to treat refractory silver ores that can otherwise be treated only by smelting.

The amount of oil necessary to bring a ton of ore to 1,000 deg. C. and keep it there a sufficient time to

volatilize the metals is variously estimated at from 15 to 25 gal. To heat the ore to 900 deg. C. for a shorter time, for chlorination only, would require considerably less. The amount of new salt required for volatilization is estimated from 50 to 180 lb. per ton, with probably less for chlorination only.

The volatilization process has not yet been demonstrated in working plants, but there is, in my opinion, a wide field of refractory ores to which it is adapted. On the other hand, the combination of chloridizing and cyaniding as outlined in this article can be considered as established, and the only new feature is its combination with the Cottrell system. It is limited to silver ores that cannot be treated by less costly processes.

For students of these processes I append a list of books and published articles. Unfortunately, the list of authors does not contain the names of many metallurgists now working on chloridizing and volatilizing precious-metal ores. A discussion of their work would be of benefit to all:

Hofmann's "Hydrometallurgy of Silver."
Eissler's "Metallurgy of Silver."
Hamilton's "Manual of Cyanidation."
A. I. M. E., Vol. LVII, "Salt in the Metallurgy of Lead," with discussions.
A. I. M. E., Vol. LIX, "An Automatic Bag Filter at Depue."
A. I. M. E., Vol. LX, "Electrostatic Precipitation."
A. I. M. E., Vol. LXI, "Use of Coal in Pulverized Form."
A. I. M. E., June '20, *Bulletin*, "Tooele Flue-Type Cottrell Treater."
*E. & M. J.*, Vol. 76, Articles by Stuart Croasdale and others.
*E. & M. J.*, Vol. 106, "Roasting Sulpho-Telluride Ores for Amalgamation and Cyaniding," by A. L. Bloomfield and J. M. Trott.
*E. & M. J.*, Vol. 108, "Silver Volatilization in Smelting," by F. P. Dewey.
*M. & S. P.*, Sept. 1, 1916, "The Mayer Arizona Plant."
*M. & S. P.*, July 12, 1919, "Chloride Volatilization Process," by Blamey Stevens.
*M. & S. P.*, Jan. 17, 1920, "Chloride Volatilization Process," by Haria R. Layng.
*Chem. & Met. Eng.*, "The Cottrell Process," by A. A. Heimrod and H. D. Egbert.

## South African Diamond Mines Prosperous In 1919

The diamond-mining industry, which, next to gold mining, is the most important of the mining industries in South Africa, enjoyed a particularly prosperous year in 1919, according to *Commerce Reports*. The output was increased from 2,543,735 carats in 1918 to 2,592,099 carats in 1919, a gain of 48,364 carats, and the value increased from $33,876,008 in 1918 to $54,688,647 in 1919, or nearly $21,000,000. Exports of diamonds during 1919 amounted to 2,752,303 carats, valued at $56,192,346, as compared with 2,571,646 carats, valued at $34,372,298, exported in 1918. In the pre-war year 1913, however, the exports of diamonds amounted to 5,503,861 carats, valued at $58,478,419.

The diamond market throughout the whole year was in a buoyant state. Prices advanced materially, owing primarily to the limitation of sales to market requirements, a policy which has been consistently pursued by the principal diamond producers in South Africa. A comprehensive agreement was reached by the three largest producers of diamonds in South Africa and the principal group of producers in the Southwest Africa Protectorate, whereby their entire output will be purchased by the London Diamond Syndicate, and placed upon the world's market through this one channel only.

## Movements of Metals and Ores in August

Imports and exports of the more important metals and ores, as reported by the Department of Commerce for August, 1919, and the figures for August, 1920, as finally revised, are as follows:

IMPORTS, AUGUST, 1919 AND 1920
(In Pounds, Unless Otherwise Stated)

| | Aug., 1919 | Aug., 1920 |
|---|---|---|
| Antimony ore, contents | 78,400 | 146,284 |
| Antimony matte, regulus or metal | 741,550 | 2,570,743 |
| Copper: | | |
| Ore, contents | 4,172,049 | 5,752,146 |
| Concentrates, contents | 3,262,921 | 5,287,911 |
| Matte, regulus, etc., contents | 1,648,708 | 130,588 |
| Imported from (in part): | | |
| Canada | 2,670,936 | 3,831,447 |
| Mexico | 3,204,371 | 2,134,787 |
| Cuba | 2,143,507 | 4,123,917 |
| Chile | 169,385 | 203,257 |
| Peru | 54,633 | 405,361 |
| Unrefined, black, blister, etc. | 15,954,604 | 17,971,202 |
| Refined, in bars, plates, etc. | 1,429,343 | ..... |
| Old, etc., for remanufacture | 439,915 | 1,894,317 |
| Composition metal, copper chief value | 98,400 | 324,717 |
| Lead: | | |
| Ore, contents | 860,654 | 1,500,484 |
| Bullion, contents | 4,959,021 | 5,139,435 |
| Imported from (in part): | | |
| Canada | 300,765 | 745,597 |
| Mexico | 5,508,058 | 5,873,237 |
| Pigs, bars and old | 1,120,089 | 7,403,826 |
| Manganese ore, long tons | 8,240 | 99,601 |
| Imported from (in part): | | |
| Brazil, long tons | 3,600 | 88,776 |
| British India, long tons | ..... | 4,900 |
| Tungsten ore, long tons | 553 | 131 |
| Pyrites, long tons | 30,705 | 48,832 |
| Imported from (in part): | | |
| Spain, long tons | 21,275 | 19,201 |
| Canada, long tons | 9,430 | 16,940 |
| Tin ore, long tons | 33 | 5,385 |
| Tin bars, blocks, pigs, etc. | 9,872,459 | 11,195,937 |
| Imported from (in part): | | |
| United Kingdom | 5,901,348 | 2,039,044 |
| Straits Settlements | 2,746,253 | 5,969,928 |
| Dutch East Indies | ..... | 220,459 |
| Hongkong | ..... | 2,387,847 |
| Australia | 224,000 | 181,440 |
| Zinc: | | |
| Ore, contents | 1,606,497 | 2,083,429 |
| Imported from: | | |
| Canada | 195,646 | 366,162 |
| Mexico | 1,402,151 | 1,717,267 |
| Blocks or pigs, and old | 11,545 | 1,826 |

EXPORTS OF COPPER, LEAD, AND ZINC
(In Pounds)

| | | |
|---|---|---|
| Copper: | | |
| Ore, contents | None | None |
| Concentrates, contents | 10,500 | None |
| Unrefined, black, blister, etc. | 1,176,390 | 61,437 |
| Refined, in ingots, bars, etc. | 47,385 901 | 39,050,235 |
| Exported to (in part): | | |
| Belgium | ..... | 2,978,454 |
| France | 8,901,736 | 14,633,149 |
| Germany | ..... | 4,808,472 |
| Italy | 4,490,261 | 112,285 |
| Netherlands | ..... | 2,327,411 |
| United Kingdom | 11,358,619 | 6,828,152 |
| Japan | 15,095,000 | ..... |
| Sweden | ..... | 2,889,617 |
| Composition metal, copper chief value | 1,226 | 11,417 |
| Old and scrap | 20,223 | 123,907 |
| Pipes and tubes | 295,856 | 653,994 |
| Plates and sheets | 591,784 | 3,901,891 |
| Wire, except insulated | 3,203,901 | 2,056,285 |
| Lead: | | |
| Pigs, bars, etc.: | | |
| Produced from domestic ore | 1,657,083 | 188,057 |
| Produced from foreign ore | 7,498,822 | 509,504 |
| Exported to (in part): | | |
| Denmark | ..... | 112,000 |
| Canada | 230,023 | 17,074 |
| Brazil | 758,719 | 134,400 |
| China | 224,305 | 6,092 |
| Zinc: | | |
| Dross | ..... | 82,100 |
| Spelter: | | |
| Produced from domestic ore | 23,204,687 | 16,268,344 |
| Produced from foreign ore | 1,519,872 | 196,020 |
| Exported to (in part): | | |
| France | 6,914,357 | 2,082,267 |
| Italy | 2,075,780 | 280,035 |
| United Kingdom | 11,390,296 | 12,579,686 |
| Mexico | 120 | 28,776 |
| In sheets, strips, etc. | 3,964,261 | 1,385,433 |

## Norwegian Nickel Industry Curtailing.

It is reported by the *Mining Journal*, London, that 200 out of 1,250 workmen employed by the Evje Nickel Ore Mines, in Norway, have been discharged, owing to the costs of production making it almost impossible for the company to compete with foreign rivals.

# Stuck Steel

## Methods That May Be Used To Eliminate One of the Annoyances That Beset the Drill Runner —Several Causes Contribute to the Handicap of Stuck Steel, Which Is Incidental to Operations in All Mining Districts

BY D. E. DUNN
Written for *Engineering and Mining Journal*

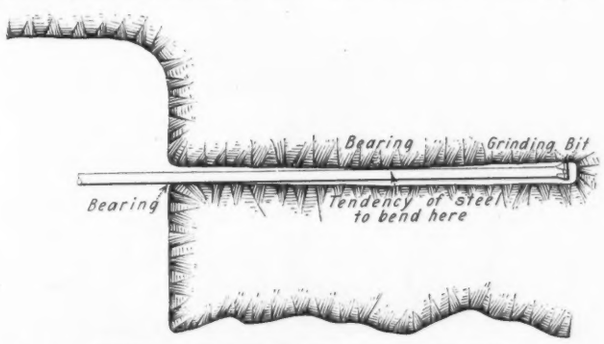
EVERY mining district has the most difficult drilling in the world. If you don't believe this, ask the drill runners about the conditions in their district. In the Michigan copper country the amygdaloid is bad and conglomerate is worse. In the Lake Superior iron district the soft hematite is sticky and the cherty iron carbonate wears the bit gage. Butte rock is hard and "fitchery"; Joplin ground is full of "vugs," and the pebbles falling behind the drill bits stick the steel—and so it goes.

One of the principal troubles that cause difficult drilling is stuck steel. Drill steel becomes stuck for the following reasons:

1. Improper alignment of drill steel and hole.
2. Incorrect type of bit.
3. Incorrectly formed bits.
4. Feeding too much or too little water.
5. Weak drill rotative power.
6. Worn or broken shanks.
7. Worn or broken drill parts.
8. Drilling into a seam or in "fitchery" ground.
9. Pebbles falling behind bit or mud collar forming behind bit.

A common cause of stuck steel is the improper alignment of the drill steel with the hole. When this occurs the drill steel will bear on at least two points in the drill hole, there is a tendency for the steel to bend, increasing with the divergence from true alignment, and a severe grinding on the reaming surfaces of the bit. All of this will cause difficult rotation and will, in many cases, stop rotation entirely.

This condition is due to poor operating. The steel must be brought nearly into line to have it enter the hole. The experienced drill runner can line up the

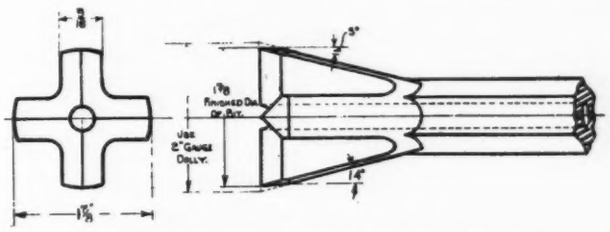



STEEL AND HOLE OUT OF ALIGNMENT

drill laterally "with his eye." He will do this after entering the steel and cranking it nearly to the cutting face, and tighten his "tee-bolt nut." He will then open the throttle (inlet) valve a little, and let the drill find its own vertical line, helping it a little by raising up on the crank end, and finally tightening the clamp bolt nut. If the hole is very much out of line time can often be saved by abandoning it entirely and starting a new one.

The choice of the proper type of bit is important in helping to eliminate stuck steel. For example, a narrow rapid-cutting chisel bit would bury itself in some soft limestones. Six-point bits are usually in disfavor because of their slow drilling and small clearance space for the cuttings.

The cutting edge has the greatest diameter on a single taper bit. This cutting edge wears rapidly, and soon the diameter is less than at another point farther back on the bit. Then the hole cut by the cutting edge is too small to admit the rest of the bit and a reaming action takes place which will soon stall the rotation and



14° AND 5° TAPER 4 POINT CROSS STRAIGHT FACE WET BIT

stick the steel. To overcome this many and varied designs of bits have been made, some of which were extremely complicated, and if they had any advantage underground, the time taken by the blacksmith to make them and resharpen them more than outweighed this advantage.

The bit that has been found most successful for rapid cutting, long-wearing gage, and ease of making and resharpening is the 14 deg. and 5 deg. double-taper cross or four point. This double-taper bit when properly made has a reaming surface whose diameter is the same as the diameter of the cutting edge and which backs up the latter with a good stock of metal, increasing the life of the gage. It also acts as a guiding surface, preventing the steel from running off into seams or fissures. The use of this type will, in the majority of cases, remedy any trouble caused by wear of gage.

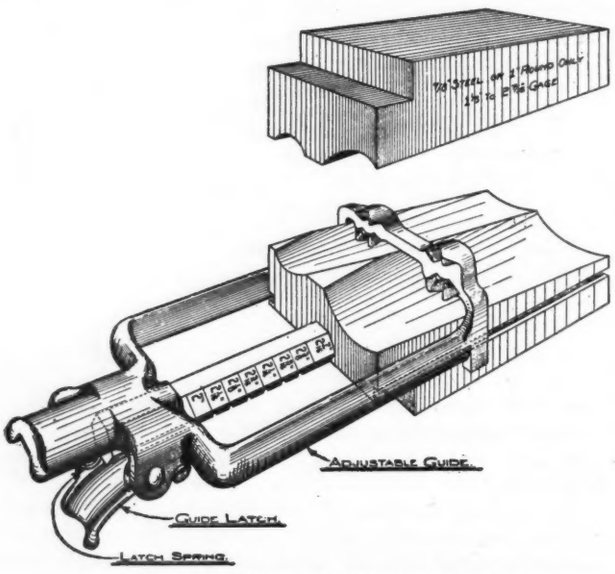
It has already been said that the bit should be properly made. That leads to consideration of the methods of making and sharpening drill steel and their bearing upon stuck steel. Primarily, there are two methods of sharpening drill steel, by hand and by machine. The latter method is by far the more rapid, accurate, and satisfactory, and should be used wherever three or more drills are in operation. However, even machine-made bits are sometimes faulty. This is usually due to careless blacksmithing, because the machines are extremely simple and rugged and, should they get out of adjustment, it is a relatively easy matter to put them into proper condition again.

The manufacturers of drill-steel sharpeners are continually making the machines more nearly fool-proof. One of the latest improvements for assuring better bits is the use of double-bored gaging blocks with an ad-

justable latch guide. The wide range of these blocks permits the operator to gage accurately an entire normal run of steel on the one set of blocks, and these adjustments for the various gages require only the pressure of a finger on the adjustable latch guide.

An interesting but less common cause of stuck steel is the feeding of too much or too little water through the hollow drill steel. When too little water is fed a mud collar frequently forms behind the drill steel, which makes it difficult to extract the latter. Sometimes when drilling into rock bearing metallic ore, and too much water is fed, a mineral separation takes place. The gangue is sludged off, and the drill pounds away ineffectively on the metallic residue, finally becoming stuck. Sometimes dry drills are run in abrasive ground. The steel soon heats up, and the temper is rapidly burned out of the bit. This condition may be remedied by using a water feed or a wet drill.

Sometimes the shank portion of hexagon steel becomes so worn that it permits the steel to slip in the rotative sleeve, or the lug on round steel becomes worn




DOUBLE BORED GAGING BLOCKS

or broken off, with the same result. The drill steel will then be hammered into the ground without rotating and will soon become stuck. The only remedy for this is to keep the shanks in proper condition. The same results are obtained when use is made of worn or broken drill parts, principally worn pawls, chuck and bushings, and broken pawl springs and rifle bars. The only remedy for this fault is to replace the worn or broken parts.

The rotation of some drills may be too weak for the rock conditions. This, however, is exceptional, because rock-drill manufacturers have strengthened the rotative power of the drills up to a practical limit. Frequently, drill trouble is attributed to weak rotation when that is far from being the true cause.

Unequal cutting may easily take place when drilling into a seam or in fitchery ground, and this throws the steel out of line and sticks it. Drilling into brecciated ground sometimes causes pebbles or small bits of rock to fall behind the bit, and these wedge against the steel and the drill hole, stopping rotation. In some limestones and other calcareous formations the water mixing with the cuttings will form a mud collar back of the bit.

In all of these instances mentioned it becomes a question of loosening and removing the stuck steel. There is one popular method of performing this operation that should *not* be followed, and that is to pound away on the drill steel with a 16-lb. double jack. This manner

HAMMERING DRILL STEEL BREAKS THE STEEL AND THE DRILL

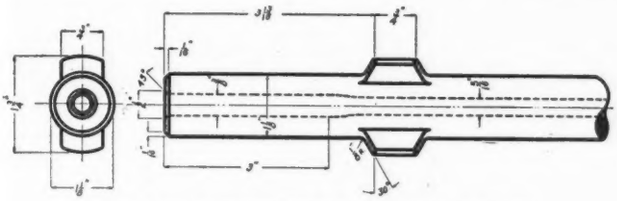
of loosening the steel is common, but usually the only real results obtained by it are bent steel, broken drill parts, strong back, and increased vocabulary. Usually the steel itself stays stuck. However, there is another method of loosening the stuck steel that is practiced

LUBRICATING GIVES THE ROTATING PART CHANCE TO WORK AND FREE THE STEEL

effectively in many camps. Here is how it is worked by Bert Chadwick, mine foreman of the Black Hawk Lead & Zinc Co. at Picher, Okla.

Upon employing a new man he shows him his working place, tells him what he wants done, and then retires to the background to wait for the new man to get into

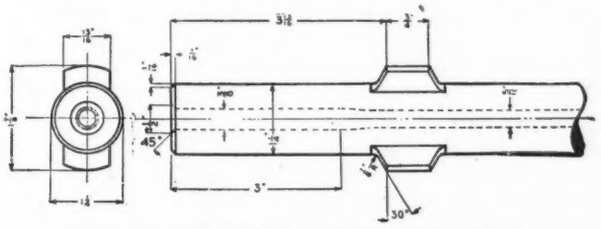
trouble. This the new man usually does, as the rocks are very oppressive and small pebbles continually fall behind the drill bits. Usually in a short time the steel will get stuck in the hole, the drill man begins to sweat, pounds the steel with a sledge, and gets no results. About this time Chadwick steps up, saying "Let me try it." He takes the oil can, fills the back and front cylinder oil pockets with oil, opens the throttle, and 99 per cent of the time the steel backs out of the hole



ONE AND ONE-EIGHTH-INCH LUG SHANK

without any further trouble. The blow slightly loosens the drill steel and the properly lubricated rotative parts take care of the rest.

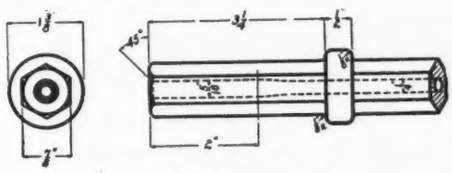
Rock-drill lubrication is not given sufficient thought, yet it is one of the most important items in drill operation. Representatives of the large oil companies and of the large rock-drill manufacturers are waging a continual campaign of education along these lines. Their greatest foes are ignorance, thoughtlessness, and neg-



ONE AND ONE-FOURTH-INCH LUG SHANK

ligence. However, the increased ease of operation and the greater speed of drilling of properly lubricated drills should convince the operator that this matter ought to be properly considered. The increased footage and the decreased cost for drill repair parts should convince the mine manager.

There are proper and improper lubricants for rock drills as for any other machinery. With every drill



JACKHAMMER SHANK

shipped is sent an "oil tag," which designates the best lubricants for that drill. These tags embody information that has meant exhaustive and costly testing on the part of the drill manufacturers. The information is valuable, and should be recognized as such. However, sad to say, a great number of operators still think that axle grease is good enough, others think cylinder oil will do, and others don't think. Representatives of either oil companies or the rock-drill manufacturers are always pleased to consult with the representatives of the mine management and to give them the benefit of expert knowledge and long and varied experience.

## Italy's Mining Industry During the War

The following table by Consul General D. F. Wilber gives the amounts, in tons, of the principal products of the mining, quarrying, and also of the metallurgical industries in Italy produced during the four years of the war as compared with the production in 1913:

| Products | 1913 | 1915 | 1916 | 1917 | 1918 |
|---|---|---|---|---|---|
| Iron ore and manganiferous iron | 603,116 | 679,970 | 946,604 | 998,632 | 694,677 |
| Manganese ores | 1,662 | 12,557 | 18,147 | 24,582 | 31,896 |
| Copper ores | 89,847 | 74,470 | 88,475 | 86,842 | 82,302 |
| Lead ores | 44,654 | 41,590 | 39,460 | 39,076 | 37,583 |
| Zinc ores | 158,278 | 80,622 | 94,043 | 79,453 | 67,116 |
| Iron and copper pyrites | 317,334 | 369,320 | 410,290 | 500,782 | 482,060 |
| Mercury (metal) | 1,004 | 985 | 1,093 | 1,071 | 1,038 |
| Sulphur and sulphur mineral, ground | 406,406 | 380,240 | 287,965 | 230,074 | 253,390 |
| Coal and lignite | 701,079 | 953,082 | 1,305,840 | 1,722,157 | 2,171,397 |
| Petroleum | 6,572 | 6,105 | 7,035 | 5,668 | 4,907 |
| Pig iron | 426,754 | 377,510 | 467,005 | 471,188 | 313,576 |
| Iron and steel | 933,500 | 1,009,240 | 1,269,486 | 1,331,641 | 992,523 |
| Copper | 2,091 | 940 | 860 | 1,248 | 1,114 |
| Lead | 21,674 | 21,812 | 24,362 | 16,237 | 18,332 |
| Zinc | ..... | ..... | 258 | 367 | 1,188 |
| Antimony | 76 | 548 | 660 | 535 | 367 |
| Aluminum | 874 | 904 | 1,226 | 1,740 | 1,715 |
| Marble | 509,342 | 246,883 | 200,700 | 134,233 | 87,483 |

The production of iron and steel increased considerably during the war, but fell off again in 1918. The production of aluminum about doubled and that of zinc, none of which was produced in 1913, reached 1,188 tons in 1918.

There was a great decrease in the production of marble, which was 509,342 tons in 1913 and only 87,483 tons in 1918.

The following table shows the number of mining companies in Italy and total amount of capital invested in them, from 1912 to June 30, 1919, inclusive:

| Year | No. of Companies | Capital, Lire | Year | No. of Companies | Capital, Lire |
|---|---|---|---|---|---|
| 1912 | 39 | 129,622,490 | 1916 | 49 | 164,865,775 |
| 1913 | 41 | 131,289,390 | 1917 | 56 | 235,486,950 |
| 1914 | 46 | 145,655,815 | 1918 | 75 | 283,596,950 |
| 1915 | 48 | 153,541,615 | 1919 (to June 30) | 82 | 336,806,950 |

Whereas from 1912 to 1916 the total capital of the mining companies in Italy increased only from 129,600,000 to 164,800,000 lire, and their number was increased by 10, from January, 1917, to June, 1919, the number of companies increased from 49 to 82 and the capital investment from 164,800,000 to 336,800,000 lire.

The Italian mining industry is most highly developed in Sicily (the Province of Caltanissetta), in Tuscany (the provinces of Florence, Arezzo, and Grosseto), and in Sardinia (the provinces of Cagliari, Sessari, and Iglesias). It is also developed in Lombardy, particularly in the provinces of Bergamo and of Brescia, and in Piedmont, in the province of Turin.

## Mica in India

The two principal mica-producing regions in India are the Hazaribagh district, in the Province of Behar and Orissa, Bengal, and the Nellore district, Madras Presidency. There is every reason, says D. A. Hall,* to expect that India will retain its position as the most important mica-producing country. The great number of deposits offer almost every grade of muscovite required in the trade. The industry is well established, and labor conditions are extremely favorable for the production of a commodity requiring such a large amount of hand labor before being ready for market. It is true, however, that the richest and most accessible deposits have been mined out, and scientific methods must be applied to mining if production is to retain its former place.

*"Political and Commercial Geology," McGraw-Hill Book Co., 1920.

# Experiences of a Custom Assayer

## Intentional Salting Easier To Detect Than Accidental—Preliminary Examination of Samples Important

BY E. C. D. MARRIAGE
Pioche, Nev.
Written for *Engineering and Mining Journal*

FIFTEEN years' continuous operation of a custom assay office in Nevada has demonstrated to me the importance of exercising the utmost care in the preliminary examination and preparation of samples submitted for assay. Errors will creep in despite of all efforts to avoid them; and it is by the successful elimination of these errors that business is built up and the necessary confidence of the community secured and held. Often, in such custom assay offices too little importance is attached to this work. Samples are tagged as received, and turned over to an assistant. A quartz sample, possibly brought in by a prospector from a new district, is passed through the crushing plant following a rich sample, with the result, sometimes, that the really barren quartz is found to contain several ounces of silver to the ton, and the prospector undertakes a long trip back to his discovery, only to find, on checking, that a mistake has been made. Thus time and money are wasted, owing to the negligence of the assayer in whom the prospector places his trust.

A few years ago several samples of gold quartz were brought into my office by a local mining promoter, which I was requested to assay for gold. The promoter explained to me that they were low in grade but represented a big tonnage and asked that I save them for future checking and for possible mill tests. As I was busy weighing my day's pulps, I turned the samples over to my assistant for preparation after quickly examining the character of the quartz in the top of the sacks, which bore out the promoter's description, being hard, glassy, and apparently very low in grade. Later in the day the promoter returned for the results. As I watched the cupels which were finishing in the muffle I could see very plainly that the results were going to be surprisingly high. Subsequent weighing indicated gold values of which the lowest was $300 per ton and the highest over $2,000. The promoter was dumfounded. He assured me of his extreme care in sampling and watching the samples when taken and evidently felt that my work was at fault. I suggested an examination of the quarterings, and together we quickly picked out a number of small pieces of apparently rich ore. Resampling, which necessitated over one hundred miles of night traveling, in which I myself assisted, gave the true results of from $2 to $16 gold per ton, but the loss of confidence resulted in killing the prospective deal.

The exact method employed by the salter in tampering with the samples and inserting the rich ore was never discovered, though his identity was known to me. He had previously requested me to melt a quantity of rich telluride ore from Colorado, the resultant gold being of a beautiful greenish color which compared exactly with the big button obtained when I assayed the saltings found on examining the original samples.

Later in the same year an owner of a group of mining claims who was endeavoring to sell his property locally made an abortive attempt to raise the grade of the prospective purchaser's sample right before my eyes. Knowing that I was alone in the assay office, and that I was in possession of the samples, he came into my office just as I was about to finish pulping them. Engaging me in conversation about some work he intended to give me, he followed me into the bucking room. Just as we entered, my telephone bell rang. Excusing myself, I started toward the front office. On second thoughts, however, I turned quickly at the door, and re-entered the bucking room, catching my friend right in the act of adding a quantity of rich argentiferous galena to one of the pulps in which he was interested. Caught red-handed, he tried to bribe me to increase the assays, and, failing in that to buy my silence. Subsequent assay of the quarterings which I had kept showed very low values. The whole matter was dropped, and my friend henceforth pursued his mining career in other fields.

In my opinion it is much easier to detect intentional salting than that which sometimes takes place in a day's run. In instances of the latter kind, a sample that apparently should assay a trace is found sometimes to contain fair values, and all the ordinary sources of possible error are traced down without the mystery being solved.

For a number of years I had been assaying for a company developing a big silver deposit, and although rich spots occurred quite frequently in the deposit, the average of the whole was proving disappointing as a milling proposition. One day a number of pulps were brought to my office by the superintendent of this company with the request for very careful assaying in duplicate for silver only. My results when submitted checked very poorly with the returns on duplicate pulps made by a traveling assayer who had recently settled in the district, mine being considerably lower. This man claimed to be employed by an Eastern exploration company which was considering an option on the property. As usual, the higher assays were trusted, and I temporarily lost considerable work.

Soon after this I ran across a number of samples of barren-looking material from the same district, the owner of the property having obtained results from the same traveling chemist showing an average of over 10 oz. in silver per ton, and he told me that he had already located a whole mountain and considered his fortune made. Needless to say, the samples ran a trace, and I suggested the only possible solution, salted flux, unless my traveling competitor was just naturally optimistic of the district's resources. The next day the latter called on me and requested me to assay his fluxes. The litharge carried a pleasing amount of silver and the mystery was solved.

In a custom office, in assaying widely varying samples of ore, too much care cannot be taken in examining the original sample as submitted for assay. The preservation of the original quarterings is a great aid in running errors to ground, thus protecting one's customers and establishing and maintaining the confidence of the mining community.

# Platinum in Colombia

## Foreign Capital To Realize Future Possibilities of Industry—Output of Choco Region Increasing—That of Urals Passed Its Peak Before War—Ordinary Methods of Production Employed

BY J. OVALLE
Written for *Engineering and Mining Journal*

THE United States of Colombia is the second largest producer of platinum in the world, being outranked only by Russia. At present, Colombia produces an average of 30,000 troy oz. of platinum per year. Her exports of the metal to the United States during the war period are shown in the following table, which also reveals the total imports into the United States:

IMPORTS OF PLATINUM FROM COLOMBIA TO UNITED STATES DURING WAR

| Year | Imports From Colombia, Oz. | Value | Total U. S. Imports, Oz. |
|---|---|---|---|
| 1915 | 13,601 | $417,938.00 | 40,538 |
| 1916 | 25,588 | 1,473,553.00 | 89,656 |
| 1917 | 21,278 | 1,536,422.00 | 30,170 |
| 1919 | ..... | 5,246,522.00 | ..... |

The value of platinum exported by Colombia in 1918 through the port of Cartagena alone amounted to $1,325,481, and the quantity exported in 1919 was over 30,000 troy oz. The decrease in imports in 1917 was due to the protracted dry season in the Quibdo district.

The significance of the table printed above becomes apparent when the fact is borne in mind that in the three years preceding the war the imports into the United States of platinum in bars, unpolished, and in other forms averaged between 100,000 and 120,000 oz. per year, and of that quantity Colombia supplied only 10 per cent, that is to say, an average of from 10,000 to 12,000 oz. yearly.

The production of the metal in Colombia has been greatly stimulated by the high prices prevailing during the war. Before the war the price in New York averaged about $45 per oz., as compared with $20 per oz. for gold in the same period. In 1917, platinum was quoted at over $100 per oz. in New York. The demand for war purposes tended to push the market price even higher, until the United States Government found it expedient in 1918 to fix the price at $105 per oz. But with the signing of the armistice the market experienced an unfavorable reaction. In 1919, the price came down considerably, but soon thereafter the demand was stabilized and the market resumed its former strength, so that in August of this year the metal was quoted in the Choco district at $110, and this price is substantially in effect at the present time. Despite the unsettled situation prevailing in 1919, Colombia managed to increase the amount of platinum exported to the United States.

Platinum is found in the Choco region, near the western frontier of Colombia, at an altitude of from 1,500 to 5,000 ft. The platinum region extends all along the Atrato River and its headwaters and along the Cauca Valley as far south as the Ecuadorean border; but the richer districts are found at the headwaters of the Atrato and along the San Juan and Condoto rivers. Most of the Colombian supply, however, comes from the Quibdo (Atrato) district.

The Condoto River district, which is a great producer of the platinum, is of alluvial formation. On account of the broken nature of the ground and the dense jungle, no accurate estimate has been made of the possible future production or of the extent of the platinum-bearing ground. In this district platinum predominates, the amount of gold found with it being about 4 per cent of the combined metals. In the Quibdo deposits gold predominates, the platinum content being only from 15 to 10 per cent of the combined metals.

Another producing section embraced in the Choco and Quibdo district, and of growing importance, is near the headwaters of the Quito River. It is being actively worked now.

The Atrato River is about 300 miles long, two-thirds of its course being navigable by steamers. It empties into the Gulf of Uraba (or Darien) through fifteen mouths, two of which are navigable by small sea-going vessels and eight by canoes. This river drains 24,000 square miles and during floods discharges 175,000 cu. ft. per second, a larger discharge, in comparison with the area drained, than any other river in the world. This voluminous discharge is due to the heavy rainfall common to this section of the country. The bars at the river mouth are covered by only 5 or 6 ft. of water, but the channel for about 100 miles inland has a depth of from 40 to 70 ft., and a width ranging from 750 to 1,000 ft. At Quibdo, 220 miles inland, the river has a depth of from 8 to 20 ft., with a width of 850 ft. The Atrato is navigable by steamers as far as the confluence of the San Pablo and Certigui rivers, a distance of about thirty miles above Quibdo.

The San Juan River has a length of 245 miles, but owing to a great number of navigable affluents, the system affords 300 miles of navigable waters. Navigation, however, is greatly hindered by bars at the mouth of the river, which are covered by only 6 or 7 ft. of water. The main river, which empties into the Pacific Ocean through seven mouths, is navigable for 140 miles by small steamers. Its width varies from 300 to 1,200 ft. Its discharge is 50,000 cu.ft. of water per second, a larger discharge than that of any other South American river flowing into the Pacific.

It has been a tradition that platinum was discovered in what is today known as Colombia in 1735 by a Spaniard named Antonio Ulloa. His report was the first news in Europe of the existence of such metal. In the old days, long after Ulloa's discovery, platinum was separated from gold and thrown away as being of no value in the Choco region. Large quantities of this platinum dust have been recovered. Recently one owner extracted seventeen pounds of platinum from the foundation of an old building in the Quibdo district.

Platinum in Colombia is generally gathered from the bottom of rivers and, as a rule, is found with gold, the proportion varying according to locality. Both metals are dug from the sand and substratum of small streams,

a work mostly done by Indians and negroes on their own initative. This method of recovering platinum is now being improved by the introduction of steam dredges. The platinum so collected is exported by way of Cartagena and Barranquilla, Colombia's chief seaports.

Foreign capital is gradually taking cognizance of the vast possibilities involved in the future of the industry and, accordingly, is entering the field in Colombia. The most important undertaking up to the present is that of the Anglo-Colombian Development Co., a subsidiary of the Consolidated Gold Fields interests, and certain American interests known under the corporate name of Compañia Minera Choco-Pacifico.

URAL AND CHOCO (COLUMBIAN) FIELDS COMPARED

In reviewing the platinum situation in 1918, the chairman of the British Gold & Platinum Corporation said, in part, with regard to the two main platinum fields in the world:

"Some time previous to the war, 90 per cent of the world's output of platinum was produced in Russia, later falling off, which was very marked even before the war, being due to the exhaustion of the best known areas in the Urals. We find that in 1911 the Russian production was 300,000 troy oz. In 1912 it had diminished to 185,381 oz., in 1913 to 173,642 oz., and in 1914 to 156,775 oz. In 1915, the Russian output fell to 107,774 oz., and in 1916 to 78,674 oz., but no doubt the decline since 1914 has been as much due to the dislocation caused by the war as to the exhaustion of the deposits, However, due attention must be paid to the fact that Mr. de Hautpick, an authority of the Russian Imperial Government, some years ago predicted the exhaustion of the Urals within a period of thirty or forty years, and it is a fact that gravels which were left as unpayable in former years have now been treated, the increase in the price of the metal having made the treatment of these gravels profitable.

"In the case of the Choco district of Colombia we have a virgin ground, with steadily increasing instead of diminishing production of platinum, the output having been 12,000 oz. in 1911, 15,000 oz. in 1912, 15,000 in 1913, 17,500 in 1914, 18,000 in 1915, and 25,000 in 1916, and I understand that in 1917 it went up to some 50,000 troy oz., showing a gradual increase since 1911, which has now reached 300 per cent, and this, be it remembered, eliminating the production of one dredge with very crude appliances indeed.

"Careful survey and prospecting carried out by British and American engineers have proved the existence of platinum and gold in payable quantities over many square mile of (Colombian) territory. The deposits of the Choco district are such as to be well suited for treatment by means of dredging and hydraulicking. When I was out there I was much impressed with the natural facilities for such mining. But the Colombian fields are really only in their infancy."

## Tungsten in Eastern Asia

The increase of output of tungsten from eastern Asia has been marvelous. In 1913 it amounted to 2,497 tons, and in 1918, to 20,228 tons—more than 56 per cent of the world's production. As elsewhere, production must decrease until the accumulated stocks in the reducing centers are used; then production will again proceed.

The alluvial deposits of China are by no means exhausted, the veins are scarcely touched, the tungsten-bearing area is large and only partly prospected, and such prospecting as has been done has been almost wholly for placers. Labor is cheap, and a large future output is sure. More liberal ideas of trade and government are slowly taking root in China, and ultimately educated Chinese or trained foreigners will work the deposits. The output for a long time will be large, though it may never again be as large as it was in 1918.

So far as can be learned, the easily worked placers and the upper parts of the veins in Burma are becoming exhausted rather rapidly, and recourse must therefore be had more and more to the mining of those parts of the veins below water level and in harder rock, and this will probably mean a diminution rather than an increase in output. Siam seemingly should give an increased production, as the mines are comparatively new, and there still should be opportunity for discoveries. The Federated Malay States and the Unfederated States (Johore, Kedah and Trengganu) should produce at least as much in the immediate future as in the past—given the demand and an equal price.*

## Iron Ore Discoveries in Russia

According to Swedish reports, enormous deposits of magnetic iron ore exist near the town of Kursk, on the borders of the Ukraine. This discovery is the result of twenty-four years of systematic surveys carried out by Dr. Ernst Leyst, formerly professor of geology at Moscow University, who died in 1918, but whose papers were rescued and brought to Sweden, where they were examined by Dr. Valfried Petersson, professor of mineralogy at the School of Mines, and by Mr. Nathorst, mining engineer to the Swedish Iron and Steel Association. It is stated that these experts have come to the conclusion that magnetic deviations of unprecedented intensity and extent established by Professor Leyst can be explained only on the assumption that they arise from enormous deposits of iron ore, running in two parallel lines in the direction north-west south-east, and situated at a distance of thirty-seven miles from each other. Both lines have a length of about fifty-seven miles and consist of a series or orebodies, but it is impossible solely on the basis of Professor Leyst's magnetic charts to estimate accurately the extent, quantity, or quality of the beds.

## British Columbia Fluorite Shipments

The volume of fluorite shipments from the Rock Candy mill, in Lynch Creek, in the Similkameen district of Canada, is increasing rapidly, according to Consul Norton F. Brand, and the Kettle Valley Ry. has established a twice-a-week service to handle the business. About 100 tons of fluorite is mined daily. It runs about 25 per cent waste, so that the resulting concentrates amount to about 75 tons per day.

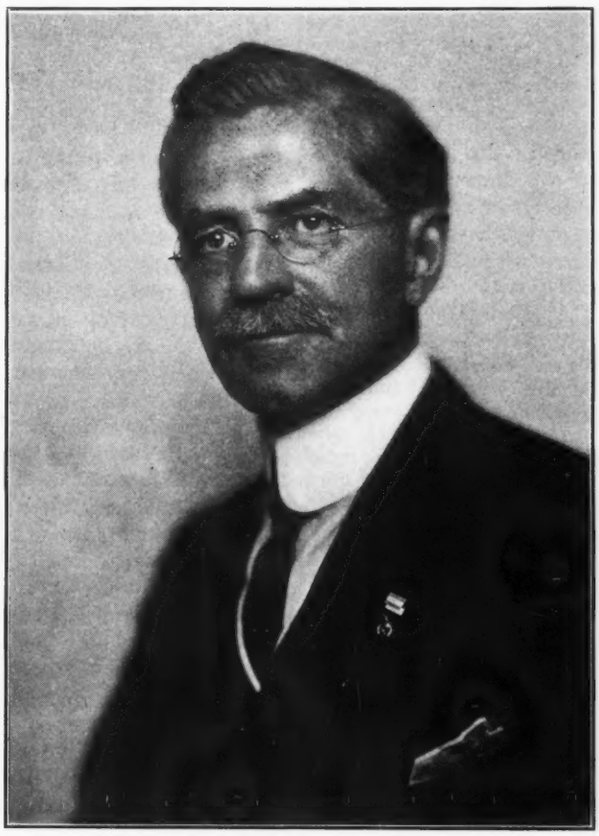
Shipments of fluorite concentrates are now being made to eastern Canadian steel plants as well as to those at Gary, Ind., which latter have received the bulk of the concentrates up to the present. An examination of the exports to the United States since Jan. 1, 1920, indicates the rapid expansion which the fluorite industry has enjoyed. During the months of January, February, March, and April the exports amounted to 64, 196½, 251½ and 416½ tons, with values of $835, $2,255, $3,270, and $5,772, respectively, making a total of 918½ tons, valued at $12,132.

*F. L. Hess in "Political and Commercial Geology," McGraw-Hill Book Co., 1920.

# Men Prominent in Mining

## James Finch Callbreath

IT HAS long been conceded that the virile spirit of the West is catching. It is not necessary that one be born within the confines of that vast domain, to be hailed as a "Westerner," for it is a generous country, democratic in its impulses, and proud to own those men and women who claim it by adoption. The West is by no means half hearted in its expression of good will to those who have aided in the work of making great those institutions in which it has an entirely justifiable pride and satisfaction. On the evening of Nov. 20, 1919, hundreds of mining men assembled at St. Louis started an ovation that has seldom been equaled in the history of industrial conventions—an ovation that began with appreciative applause and ended in an outburst of spontaneous cheering. This tribute was paid to James F. Callbreath, secretary of the American Mining Congress, in recognition of fifteen years of unbroken service in behalf of that organization. The American Mining Congress stands today as a monument to the persistence, diligence and whole-heartedness with which Mr. Callbreath initiated and carried out his plan for a great national mining organization. James Finch Callbreath was born at White Lake, Sullivan County, N. Y., in 1858. He received his early education in the public schools, and was graduated from the University of Denver with the degree of LL. B. During the early period of his life, which was spent in Sullivan County, he devoted his efforts largely to newspaper work, and was for many years editor and publisher of the *Sullivan County Republican.* From 1887 to 1890 he was chairman of the Sullivan County Republican Committee and took an active interest in political affairs.



JAMES FINCH CALLBREATH

Mr. Callbreath was among those who believed in the opportunities of the West. Establishing himself in Denver, he became editor and publisher of the *Mining Reporter,* which he conducted for a number of years before that publication was merged into *Mining Science.* From 1895 to 1906 he practiced law in Denver and again became active in political affairs, finding himself a member of the Denver Charter Convention in 1903 and elected to the Denver City Council in 1904, with which body he served conspicuously as an exponent of civic improvements. He was also elected president of the Denver Chamber of Commerce in 1903. During these years he became interested in a number of mining operations. The American Mining Congress then had its headquarters at Denver. It was an ambitious organization, but mostly ambition. No one seemed to have sufficient time to execute its mission, and interment seemed imminent. In 1904, at the Portland, Ore., session of the organization, Mr. Callbreath was persuaded to step into the breach, with the understanding that he was not to be called upon for more than half of his time. As secretary, the office which he still holds and which has always been the chief executive and active position, he not only caught the spirit of the co-operative movement but quickly visualized the great opportunities of the future. Agitation was then developing for representation of the mining industry at Washington. Mr. Callbreath was the logical leader, and he quickly developed a program of activity that has since occupied his entire attention. He spent many months at Washington in an effort which eventually resulted in the creation of the United States Bureau of Mines, with the late Dr. Joseph Austin Holmes as its director.

The success of the American Mining Congress and the worth of Mr. Callbreath's straight-line methods became recognized. He has, since 1907, devoted himself exclusively to the furtherance of the interests of the mining industry and the upbuilding of the organization. It is no longer a one-man, one-room institution. It is a great national chamber, with a continuous record of signal accomplishments, embracing seven distinct divisions, representing practically every branch of the minerals industry, with a trained specialist in charge of each department. Its offices occupy 4,000 sq.ft. in the Munsey Building, Washington.

The history of the mining industry is replete with individual accomplishments of national value, but perhaps no one servant of the mining interests has covered such a representative field as the Secretary of the American Mining Congress—James F. Callbreath.

# By The Way

## The Aërial Tramway Improved

The psychological moment has been seized by the Davino Aërial Apparatus Co., of Los Angeles, to put their aërial transportation device before the mining public. Shippers in many localities have been confronted with a serious problem since freight rates went up on Aug. 26. In some cases the old rate has been restored but many operators are still facing the dilemma of having to shut down or else ship at a loss. At this crisis the Davino company appears on the scene. This company, according to an advertisement in a southwestern contemporary, manufactures, or will do so if it receives an order, a whale-shaped propeller-driven airship that is depicted in an illustration as speeding from mountain peak to mountain peak suspending from an overhead aërial tramway, resembling a series of miniature Brooklyn Bridges. No money is needed—an interest in the mine will suffice. The company states:

> We offer to anyone who can show us a mine worth operating the installation of our lines at our own expense for an interest in the mine. We can construct small light capacity lines, single rail or double rail, to handle any mine capacity regardless of the nature of the country, and our machines will climb steep grades impossible by other types of transportation at high speeds. We will guarantee our service and if you are interested, and have a mine, especially one that is held up on account of transportation, here is your chance.
>
> Send in a map, mark your mine; if you have some neighbor miners interest them so we can link a group of mines on one line. If you can send us a sample of your ore, or asbestos, or whatever your product is (we will return upon your request), have it accompany a letter giving the value of each mine, an approximate value of ore per ton or product per ton, and your offer of an interest in the mine for our transportation, or for handling the raw material to the finished product at our expense.
>
> Gentlemen, our machines may seem odd, especially the use of the propeller in connection with mining work, but we do not care about anyone's opinion. We furnish the money and our machines do what we claim.

The value of this new mode of transportation has already been demonstrated in the amusement world, according to the company. The chances are that it will continue to furnish amusement on being introduced in the mining world. Whatever the outcome, however, the company cares for no one's opinion, as it proclaims.

## Wet Competition

An amusing experience was related by one of the early adventurers on the Yuba River in California, who chose an easier way of making a living than by standing all day in the water washing gravel, according to Hittel's History of California. He said that he had managed with great toil and at great expense to get a large cask of whisky to some rich diggings on that river where he broached and commenced retailing it at immense profit. On the next day, however, he noticed that his custom fell off; and, on investigation, he found that another Yankee had also rolled up a cask of whisky and was underselling him higher up the river. As a counter operation, he moved still higher up stream by a circuitous route and reopened; but it was not long before his competitor again supplanted him; and from that time on the two rivals continued running opposition and cutting each other until finally, growing wiser, they formed a combination with the intention of keeping prices up to the highest notch and jointly reaping the profits. But almost as soon as the new concern was started a canvas house went up next door, on which was written, in large letters,"Liquor Store," and the backbone of the monopoly was thereby effectually broken.

## Illustrated

The latest report of the Broken Hill Proprietary Co., of Australia, closes with a half-dozen interesting photographs taken about the company's Newcastle steel works. One of these shows H. R. H. the Prince of Wales, K. G., upon the occasion of his visit to the plant last June. Another is a view of the blooming mill. Reports of this sort are far more readable when illustrated in this fashion. The extra cost is negligible.

## The Optimist in Mining

Bonanzas are not altogether things of the past in the United States. A prospectus has recently come to hand of a company claiming to hold property in the Black Hills of South Dakota, the manager of which "conservatively estimates" the "probable ore tonnage" at 1,000,000 tons of mica, 2,000,000 tons of 3 per cent tungsten ore, 25,000,000 tons of feldspar, and 5,000,000 tons of 2 per cent tin ore, the gross value of all of which is put at $381,000,000. This company is the American Minerals Co., which claims that it is operating at Keystone, S. D., under a declaration of trust dated Aug. 24, 1920. The manager, C. T. Cabrera, says that he feels justified in stating that this estimate is less than one-sixth of the actual tonnage on the company's properties. He does not state, however, whether the balance is tin or tungsten ore, mica or feldspar. Net earnings during the next twelve months, based on single shift operation of the mines and on the operation of the "two mills now under construction," are estimated as follows: Mica, $1,449,420; tungsten, $51,000; feldspar and lithia ores, $50,000; and tin and tungsten, $800,000. The manager says of tin, "The market is steady and regular, running around 60c. per pound with very little variation, and the supply produced seldom equals the demand." Mr. Cabrera is to be complimented for the restraint he places on his imagination and for his conservative statements. One can only wonder what he might have said if he had been feeling real optimistic.

## In Memory of the Pilgrims

The new Pilgrim half dollar is now to be obtained, though it may hardly be said to be in circulation. Attractive in design, it shows the figure of a Pilgrim Father on the face. On the back is depicted the Mayflower under full sail. We paid the National Shawmut Bank of Boston a dollar for our copy of this half dollar, and, although we do not quite understand the nature of the transaction, we believe we got our money's worth.

## A Recommendation

It is against the general policy of this chronicle of mining engineering progress to recommend one good product in preference to another. However, we cannot refrain, after careful investigation, from recommending the Marcy[1] to millmen. Even so, we must admit that the odds favor Harding.

[1]The latest Arrow collar.

# CONSULTATION

## Ground Mica

"We herewith take the liberty of asking you whether you are in position to give us the address of any person who has a knowledge of the right way of making mica powder for wallpaper manufacturers?

"We have here in Sweden some mica mines, and from them we can produce hundreds of tons of mica powder. We have made some trials to grind mica but not with a good result."

Both Government and private agencies have found it difficult to obtain information regarding the details of the various processes for grinding mica. Operations are frequently shrouded in needless secrecy, and the processes zealously guarded. However, sufficient information has been published or given out otherwise to make known the general details of the various methods.

A. L. Hall has classified the methods of pulverizing mica into (1) disintegration by heating, (2) abrasion with millstones or metal burrs, and (3) baking at intense heat, followed by pulverization by a blast of steam. As millstones require water to wash out the ground material, and drying is difficult, they are not frequently used as a pulverizing medium. The most modern method, baking and steam-blast pulverizing, has not been widely used. Reliance has mainly been placed upon a mechanical grinding machine or pulverizer in the form of a metal cylinder lined with corrugated cast steel and containing a revolving shaft to which are attached disintegrators or metal heaters. When the shaft is rotated at a high speed (3,000 r.p.m.) and pieces of mica are introduced into the cylinder a pulverized product is made which can be either drawn from the cylinder by an exhaust blower or removed by falling through a screen. A precaution to be observed in using such a machine is that not too much material is fed into the cylinder, as the pieces expand greatly on being ground, and any excess of material may choke the machine.

The ground material is carefully screened, customarily on a set of vibrating screens. Products of 8, 10, 24, 40, 60, 80, 120, 160, and 200 mesh may be made. Separation by means of air currents and gravity has also been used, but how successful such installations have been we do not know. There is a plant at Denver, Col., which employs the pneumatic system of separation, resorting to a special air-tube mechanism, which causes the velocity of the ground material to be so retarded that the material settles in various bins according to its fineness.

In constructing any plant to grind mica provision should be made for the manufacture of ground-mica products other than those for use in the wallpaper industry. This will insure a wider market range through a diversified product. Ground mica has a variety of useful purposes. Thus, it is employed in the manufacture of some lubricants, fancy paints, tiles, and concretes. Rust-preventing paint can be made from a mixture of ground mica and aluminum. Owing to its heat-resisting qualities, ground mica is also used in pipe and boiler coverings and in fireproof paints. The rubber-tire industry uses ground mica as both a tire ingredient and a powder for inner tubes. Some roofing preparations consume quantities of ground mica. In India it is reported to be used even in medicines.

## Electrolytic Zinc References

Our company has a complex zinkiferous ore carrying the zinc as sphalerite, copper as tetrahedrite, and good silver values with the tetrahedrite. We are desirous of making a complex concentrate and then treating same by alectrolytic process to eliminate the zinc. We desire to erect a plant to handle only from 7 to 10 tons of concentrates per day. How and where can we get reliable information relative to the electrolytic process and cost data of a small plant?

The following papers treat the subject of electrolytic zinc production in more or less extended fashion, and give up-to-date information on the subject:

"Electrolytic Zinc." By C. A. Hansen, *Transactions* American Institute of Mining and Metallurgical Engineers, vol. 60, pp. 206-242.

"Electrolytic Zinc Extraction at Trail, B. C." By E. H. Hamilton, *Transactions* American Electrochemical Society, 1917, Vol. 32, p. 217.

"The Future of Electrolytic Zinc." By Thomas French, *Transactions* American Electrochemical Society, 1917, Vol. 32, p. 321.

"Some Economic Factors in the Production of Electrolytic Zinc." By R. G. Hall, *Transactions* American Institute of Mining and Metallurgical Engineers, 1918, Vol. 57, p. 709.

"Electrolytic Zinc Plant of the Judge Mining and Smelting Co." By L. W. Chapman, *Chemical and Metallurgical Engineering*, issue of March 24, 1920.

"Electrolytic Zinc Plant of the Consolidated Mining and Smelting Co. of Canada, Ltd." By L. W. Chapman, *Chemical & Metallurgical Engineering*, Aug. 11, 1920.

## Chrysotile, Crocidolite, and Amosite

"I am somewhat confused by the difference between several varieties of asbestos, such as a chrysotile, crocidolite, and the rarer form amosite. Will you kindly endeavor to make clear in your "Consultation" page the distinction between these several types?"

The three varieties of asbestos, chrysotile, crocidolite, and amosite, are all commercial forms. Chrysotile is a form of serpentine asbestos, whereas the other two are forms of amphibole asbestos. Chrysotile in Canada occurs in serpentine derived from the alteration of peridotite, and in Arizona from the alteration of limestone. Rhodesia and the Transvaal contain important deposits of chrysotile asbestos of excellent white quality, but which may shade to a pale green.

Crocidolite is a variety that is peculiar to the South African deposits and occurs in the Asbestos Mountains of West Griqualand in cross-fiber veins inclosed in thinly bedded shaly rocks. It is remarkable for its blue color and high peroxide of iron content. Lavender-blue crocidolite is also reported in the area.

Amosite, the third variety of asbestos, is a grayish white monoclinic iron amphibole, which is produced in the Lydenburg and Pietersburg district of the Transvaal. Indications point to large African resources.

# THE PETROLEUM INDUSTRY

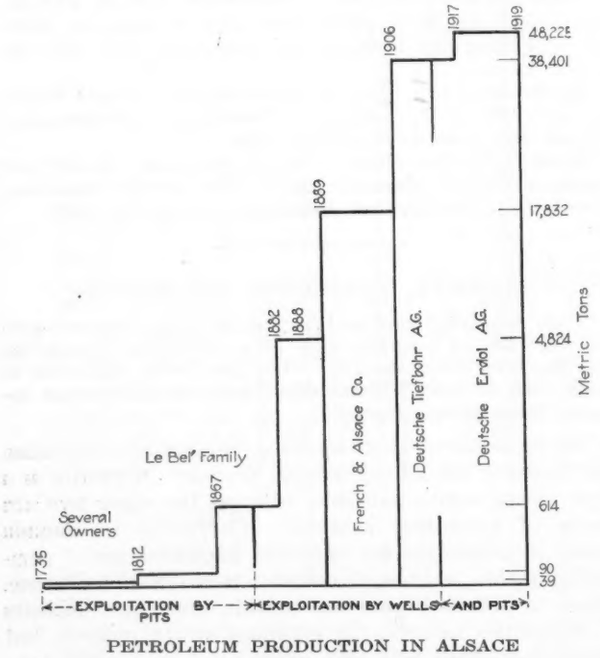
## Petroleum Industry in Alsace

BY ANDRÉ SURNY-DE BONNIER

Written for *Engineering and Mining Journal*

In the fifteenth century (1498), an oily matter was discovered[1] in a water well on the spot known today under the name of Pechelbronn, and was used for medicinal purposes. The exploitation of the petroleum began at the end of the eighteenth century, and the accompanying diagram shows the development of the field, which covers about 44,000 hectares. Its length varies between twenty and twenty-seven miles and it is about ten miles wide. Different kinds of oil are found in the various oily sand beds; for instance, from 170 to 200 ft. deep a sort of asphalt is found, and from 230 to 300 ft. there is a heavy oil, and the lighter oils occur at greater depths.

The first exploitations were made by shallow pits, and the sand was washed with hot water to obtain the greasy matter. This method was practiced up to 1875, and was then replaced by underground galleries, from which the petroleum, after being collected, was pumped. Later the plan of drilling by means of the Fauvelle system with water injection was tried with success, and




PETROLEUM PRODUCTION IN ALSACE

today about forty installations of drilling apparatus are in use. About one hundred wells are drilled every year, from 1,000 to 1,200 ft. in depth.

Following the remarkable experiments that Paul de Chambrier made in 1897 to show how large was the quantity of oil left in the sand bed when exploitation was made exclusively by drilling operations, it was decided to not only continue the exploitation by well but to exploit also by means of underground galleries, where the petroleum could collect. It is estimated that from six cubic meters of oil in the ground only one meter can be pumped. To recuperate part of the oil left in the ground and to increase the production during the war, the Germans dug several pits. Three are today in operation, with 3,400 meters of galleries.

The pumping operations are expensive and slow. The average quantity given by wells, of the 500 producing wells of the region, is only 240 liters daily. On the other hand, the time during which petroleum can be pumped is usually long, from fifteen to twenty years. The total production of the field is 50,000 metric tons yearly. This corresponds to 1/1000 of the world production and to one-eighth of the total pre-war importation of oil in France.

The recovery of the Alsace oil field is consequently a great help to France. It is not only a material gain, but makes her, in case of necessity, independent for some of the oil products. The occasion is also propitious for organizing on French soil a practical school of petroleum technology, and for teaching her sons how to take advantage of the hidden treasure contained in her soil and in that of her colonies.

[1]Paul de Chambrier (general-director of the Pechelbronn mines), "History of Pechelbronn, 1498-1918." Attinger Bros., Paris and Neuchatel, 1919.

## Prospecting for Petroleum In Queensland

SPECIAL CORRESPONDENCE

Prospecting for petroleum in Queensland has been in progress for a number of years, and early in September, 1919, there was a development which may be pronounced at least encouraging. The locality where the boring has taken place is at Roma, on the Western Railway, 318 miles west of Brisbane, and at an elevation 979 ft. above sea level.

Operations in the search for oil at this place have been attended with many vicissitudes and delays, but the belief is strong among experts and others that the oil is there, although whether in commercial quantity of course nobody can say. An artesian well sunk in 1899 was being deepened in 1900, when at 3,683 ft. natural gas to the extent of about 40,000 cu.ft. per diem was obtained. This gas was allowed to go to waste for over four years, after which, when the quantity was 70,000 cu.ft. a day, a gasometer was built, the township was reticulated and the town lighted; but the gas had been turned on only ten days when the supply so diminished that the lighting scheme had to be abandoned. In 1907 a mineral-oil prospecting company began the sinking of a bore close by, and at a depth of 3,702 ft., in October, 1908, struck a heavy flow of gas, which some people alleged smelled of petroleum, but which was immediately ignited from the boiler fire, and was not extinguished till the following December. In an attempt to sink the bore below the gas zone the tools got jammed in soft "running" strata, and in March, 1910, the bore was abandoned.

After a lot of investigation and obtaining expert advice from abroad the government took the matter in hand, engaged a petroleum engineer from California, and started another bore. This was begun in January, 1916, and carried on by the expert until about the middle of 1918, when, his term having expired, he returned to America, leaving an assistant borer, who had also been secured from the United States, in charge. The depth reached was then 3,230 ft. By May, 1919, the bore was down to 3,705 ft. (about the depth of the gas zone proved in the previous bore), when a weld in the stem broke, leaving the bit and two feet of the stem in the hole. All attempts to remove the tools failed, and the second American borer left for home. In August, 1919, however, while a man engaged in Australia was employed in removing some of the casing with a view, if possible, of boring past the obstruction, a heavy flow of gas, evidently released by the work in hand, was encountered. There had previously been indications in the bailings from depths ranging from 3,610 ft. to 3,700 ft. of gas of a petroleum nature, and the strong flow now struck unmistakably bears evidence of containing oil. When the last mail left officials were engaged in measuring the flow and analyzing the gas.

Recently a license has been taken out to prospect for oil at Goodna, seventeen miles from Brisbane, and the company formed for the purpose has already begun boring operations there.

## Petroleum Situation in Rumania

Rumania possesses an area of 20,000 hectares (1 hectare = 2.47 acres) recognized as oil bearing, of which only 2,500 hectares are being worked, according to Consul Edwin C. Kemp in *Commerce Reports*. The total of possible oil-bearing land is estimated at 100,000 to 150,000 hectares. These lands are located in the Carpathians, the principal centers being Prahova, Bacau, Buzeu, and Dambovitza; 90 per cent of the output comes from the Prahova district. The bulk of the production is refined and the residue is used in Rumania for fuel purposes, for which there is an increasing demand.

In 1916 the wells and refineries were destroyed before the invasion of the enemy, who immediately began repairs, and obtained a production of 450,000 metric tons in 1917 and 1,214,000 in 1918, the greater part being used for military purposes. When the enemy withdrew, the re-establishment of the industry was undertaken, but the production in 1919 amounted to only 920,000 tons, and reports for the first six months of 1920 show about 463,000 tons. This decrease in production was due partly to a strike in the oil fields from July 10 to Aug. 20, 1919, but more to the lack of materials for drilling and refining and to lack of storage space.

The decreasing value of the leu and the lack of transportation made it difficult to obtain materials needed for the repair and maintenance of the refineries and wells. This lack of transportation, which included the unrepaired pipe lines, also made it difficult to utilize the storage facilities at the ports and necessitated stopping the flow of a number of wells. Especially is this true of two of the largest producing companies of the Moreni district not in the "Birex" export organization, which had a certain outlet via the Danube to adjoining countries. In 1919 drilling fell to 10,000 meters, as compared to 80,000 to 100,000 meters in a normal year. It has been estimated that material to a value of 1,000,000,000 lei per year will have to be imported for five years to bring the annual production up to 2,000,000 metric tons.

## Bureau of Mines To Advise on Petroleum Losses

Engineers, chemists and automobile men throughout the country have been working toward the development of some liquid fuel as a substitute for gasoline to meet the increasing demands. The Bureau of Mines states that the entirely preventive losses in the evaporation of gasoline from crude petroleum from the time the petroleum leaves the wells until it arrives at the refineries reaches a total of more than 300,000,000 gal. each year, or sufficient to keep 1,200,000 automobiles in commission for a year if each car uses 250 gal. of gasoline.

These are merely the preventive losses from evaporation alone and do not take into consideration other losses, many of which in part may be avoided. The total loss from evaporation amounts to more than 600,000,000 gal. of gasoline for the country, according to the investigations of the Bureau, which has calculated that one-half of this, or 300,000,000 gal. of gasoline, may be saved. The Bureau will soon issue careful directions to the oil men as to how this situation may be remedied.

## Soviet Russia's Oil Supply

Professor Johan Lomonosov, who, with Krassin, arrived in Stockholm from Reval on July 23, has been appointed by the soviet government as its representative in Sweden to superintend the delivery of the locomotives now on order on Russian account.

In this connection a most important consideration for Russia is that of fuel. Lomonosov has during the past few months been staying in the coal and oil districts of south Russia and the Caucasus, and on that point he is extremely optimistic. There are stored, 500,000,000 poods (1 pood = 16 kg.) of oil, which is being transported as quickly as tonnage is available.

## Bureau of Mines Warns Against Fraudulent Representation

A number of instances have recently been brought to the attention of the Bureau of Mines in which reports of analysis made by the Bureau have been used for advertising purposes. General statements made by the Bureau have been used to advertise trade-marked or proprietary preparations. For example, one company submitted a sample of motor fuel to the Bureau of Mines during the war to see if it would be satisfactory as an aviation fuel. Recently, this same company has been advertising a motor fuel under a trade name as having been "thoroughly tested by the Government Bureau of Mines in Washington, D. C., successfully fulfilling every claim made for it by the inventor." On investigation it has been found that the fuel which is being advertised is different in character from the fuel originally submitted for test.

The Bureau wishes to emphasize that analyses and tests are made only when it is a matter of public interest to do so, and no authority has been or will be given to use this information for advertising purposes.

# NEWS FROM THE OIL FIELDS

## New 100,000-Bbl. Well in Amatlan Field

*From Our Special Correspondent*

One of the largest wells in the Amatlan field was brought in recently when the Freeport & Mexican Oil Co. struck oil in its well No. 3 on Lot 251 Amatlan. A conservative estimate of the daily production is estimated at 100,000 bbl. The pay was encountered at a depth of slightly over two thousand feet. This well is offset by a well owned by the Cia El Aguila which is producing about 50,000 bbl.

Thompson's well on Lot 114 Chinampa has been drilled in at the depth of 1,986 ft. It is producing about 40,000 bbl. daily. This is the shallowest well in the Chinampa field and seems to be on the summit of the oil dome which underlies this famous lot. A pipe line has already been laid and is being connected to the well.

The Transcontinental Co's well No. 3 on Lot 134 Chinampa has been successfully closed in, after flowing wild for over two weeks. When the broken valve was taken off the casing the well shot the oil over the crown block of the derrick. The well has been flowing 40,000 bbl. since it came in.

## Johnson County Prominent Among Kentucky Fields

*From Our Special Correspondent*

Johnson County, Ky., is rapidly assuming first place in the new fields, as Warren gradually takes its place among those of proven territory. A 15-bbl. well has been found in the corporate limits of Paintsville, the county seat, making it the first Kentucky town to enjoy this distinction. A good well was brought in on the Davis farm, one mile away. The Virginia-Kentucky Oil Co. owns this well, and has also brought in two on the Rice farm, said to be 20-bbl. producers.

A gusher estimated at 500 bbl. daily production was brought in by the Georgia Petroleum Co. on the Lloyd Crowe lease, in Warren County, recently. It came in flowing a stream the size of the casing, over the mast. The depth was 370 ft. The well on the Pete Foster lease is now on the pump, and making 15 bbl. The Stoll Oil Co. is laying a new pipe line in Warren County from wells in the Woodburn vicinity to Rock Quarry loading station.

The Whittaker Oil Co. brought in No. 2 on the Nicoll lease near Bowling Green, good for 75 bbl. Another 75-bbl. well is No. 2 on the Gonce lease, nine miles south of Bowling Green. What may prove a new shallow pool has been found along the Barren River, where a flowing well was brought in on the John Campbell farm. No. 2 on the Whittaker farm was brought in at 478 ft. and showed 204 bbls. in a 24-hour test.

In Lawrence County, a 25 bbl. well has been drilled on the Meredith-Kelley lease. In Powell County, a 1,500-ton shale plant is being built. The Twin Lakes Petroleum Co. reports a 25-bbl. well in Simpson County, near Temperance. Phelps and associates will begin drilling four wells on the Gibson lease in Allen County.

Officials of the High Gravity Oil Co., under indictment for conspiracy to defraud investors, were exonerated in Federal District Court here when the jury was given peremptory instructions to dismiss the case. Sixty-two persons from all parts of the United States were present, claiming to have been defrauded. They besought the District Attorney to "find some other way," but there was none. Principal defendants were William F. Sheridan and two sons, William F., Jr., and Redmon F. Sheridan.

## Mining and Metallurgical Society Discusses Petroleum

At a meeting of the Mining and Metallurgical Society on Oct. 27, Van. H. Manning addressed the members upon the petroleum situation at home and abroad, saying in part:

"One of the unfortunate results of the war has been a departure from a friendly spirit of competition in business between some of the nations of the world. A nationalistic tendency has developed. We must expect as a natural result of the war an awakened sense of self-protection. All nations may well give serious consideration to the question of their future supply of raw products, but this must not be at the price of sacrificing principles in international trade which are the very substance of world progress in peace. It is, moreover, not a far-sighted policy to conserve within the confines of any nation the materials which are now essential to civilization and the world's progressive welfare."

After pointing out the actual condition of petroleum as revealed by the latest statistics, Mr. Manning discussed the attitude of the United States toward foreign restrictions, and the attitude of those nations controlling foreign sources of supply.

As confirmed by the subsequent remarks of Dr. Ledoux and Mr. Ralph Arnold, Great Britain and France are keenly desirous of obtaining the participation of Americans, or the United States Government, in their ownership and production of future petroleum supplies, so that there is no reason to exect any great difficulty in arriving at an *entente cordial*.

In closing his remarks, Mr. Manning suggested a plan of action, saying:

"Our diplomats are doing all that is humanly possible to untangle this intricate problem and your help is needed. No greater or more lasting and far-reaching service can be rendered than making possible and effecting the securing by or for American citizens a participation in the development of the world's resources of petroleum. This may be accomplished under the following plan:

1. To make a careful study of the oil resources of the world and the laws and regulations governing these resources.
2. Congress should enact a general reciprocity measure covering all trade relations with foreign countries.
3. To encourage our nationals to acquire and develop and market oil in foreign countries:
   (a) By an assured adequate protection of our citizens engaged in securing and developing foreign oil fields.
   (b) By co-operative action on the part of the industry under Federal charter or otherwise that will permit the industry more effectively to perform its function in seeking out and acquiring oil territory in foreign countries, developing the same and distributing the petroleum produced therefrom.

"When these things have been accomplished, our State Department should begin negotiations to develop an oil entente for all nations. If there could be brought about an association of international relationship between these oil-producing countries working in harmony to furnish the world with power and light, a repetition of a World War would be impossible."

## Possibilities for Third Oil Field in Arkansas

*From Our Special Correspondent*

The Arkansas Natural Gas Co. has had a show of oil at 2,232 ft. in its well in Sec. 1-15-15 Calhoun County, Ark. Casing is being set for a test. If this well develops commercial production it will be the third field in Southern Arkansas, the two already known being the Hunter, near Stephens, Onachita County, and the Constantin, near El Dorado, Union County.

## Utah Oil Notes

*From Our Special Correspondent*

The experimental plant of the Western Oil Shale Co. at Vernal is reported to be doing satisfactory work and the operators are considering enlarging its capacity. The Galloupe process is being used.

The Ohio Oil Co. has been granted an oil leasing permit on lands near Caineville, Wayne County, and is expected to begin work as soon as oil-drilling apparatus and tools have arrived. This company will also start drilling in Garfield County near Circle Cliffs. The company expects to expend considerable money to ascertain the value of the ground it has under lease.

# Technical Papers

**Mineral Statistics** — The Imperial Mineral Resources Bureau is issuing pamphlets containing a statistical review of various minerals during the period from 1913 to 1919. These pamphlets are somewhat like the sections of Mineral Resources published annually by the U. S. Geological Survey. Those so far issued are: "Nitrates," 28 pages, price 9d.; "Arsenic," 19 pages, price 6d.; "Felspar," 16 pages, price 6d.; "Magnesite," 42 pages, price 1s. 3d.; "Borates," 24 pages, price 9d.; "Fuller's Earth," 15 pages, price 6d.; Monazite, 15 pages, price 6d.; and "Chrome Ore and Chromium," 29 pages, price 1s. A bibliography of the important publications on each subject during the last six years is a good feature of each book. They may be obtained from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2.

**Southwestern Arizona**—The future of mining in southwestern Arizona (pp. 5) is discussed by J. C. Anderson in the August number of the *Mining and Oil Bulletin* (Los Angeles, Cal., 25c.). The last two or three years have witnessed a gradual resumption of activity in the district around Tucson and to the southwest.

**Kaolin**—The Division of Geology of the Department of Conservation, State of Indiana, (Indianapolis Ind.), has published a cloth-bound book of 131 pages entitled "Kaolin of Indiana," which may be obtained for 50c. The geology and development of the deposits in the southern part of the state are described. The principal uses of Indiana kaolin have been in the ceramic industry and in the manufacture of aluminum sulphate.

**Ontario Natural Gas**—A report on the natural gas situation in Ontario has been published as Part V of the Twenty-ninth Annual Report of the Ontario Department of Mines. (Toronto, Ont., free.) A serious and general shortage of natural gas exists in that province.

**South African Iron Ore**—A brief description of the occurrences of iron ore and fuel suitable for smelting, in South Africa, occupies fourteen pages in the July *South African Journal of Industries* published by the Government Printer, Box 373, Pretoria, price 6d.

**Misfires**—"Misfires in Metal Mining" is the title of the U. S. Bureau of Mines *Reports of Investigations*, Series No. 2,156 (three pages), obtainable on request to the Bureau at Washington. Eleven recommendations are given for reducing the number of missed holes to a minimum.

**Graphite**—The U. S. Tariff Commission, Washington, D. C., has published a very complete little booklet of twenty-eight pages entitled "Information Concerning Graphite." It may be obtained on request. Information is given on the domestic and foreign production, various grades, milling methods, costs, etc., and a list of domestic producers in 1917 is appended.

**Oil From Shale**—David T. Day has an article in the September *Review of Reviews* in which he discusses the petroleum shortage and points out the development of oil shale as the logical remedy.

**Porcupine Goldfield**—*The Mining Magazine* for September (Salisbury House, London Wall, London, E. C. 2.; price 1s. 6d.) contains an excellent eleven-page article on the Porcupine goldfield in Ontario. This is considered the most promising gold district in the world. The Hollinger mine is surpassed by only one or two mines in present output and by none in prospects. Mining, milling, and economics are discussed.

**Wyoming Oil**—Bulletin 716-C of the U. S. Geological Survey (pp. 18) describes geological conditions in the Mule Creek oil field, Wyo.

**Tennessee Minerals** — The twenty-fifth annual report of the Mining Department of Tennessee, Nashville, Tenn., (free), is at hand. Though mostly devoted to coal, short chapters are included describing the activities among the state producers of barytes, bauxite, cement, clay, copper, gold, silver, iron, gas, mineral paint, oil, lime, phosphate, quartz, sand and gravel, stone, zinc and lead.

**Iron Ore in Montana**—Bulletin 715-F of the U. S. Geological Survey (pp. 8) describes iron-ore deposits near Stanford, Mont.

**Cinnabar**—U. S. Geological Survey Bulletin 715-E (pp. 11) is devoted to the geology of the Yellow Pine cinnabar-mining district in Idaho.

**Hydrotalcite**—The U. S. National Museum, Washington, D. C., has issued an eight-page pamphlet on the chemical composition of hydrotalcite, pyroaurite, stichtite, and brugnatellite. It may be obtained upon request.

**Molybdenite**—A two-page description of the Standard Molybdenite mine and mill at Everton, Victoria, is to be found in the September issue of the *Chemical Engineering and Mining Review* (Melbourne; price 11d., post free).

# Recent Patents

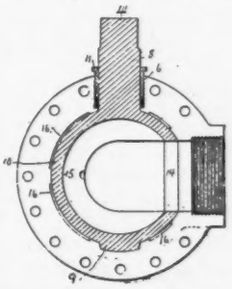
**Rock Crusher.** No. 1,354,855. John G. Simpson, Knoxville, Tenn.

**Mining Drill.** No. 1,354,944. Carl Biernat, Glasford, Ill.

**Overflow Separating Device.** No. 1,355,070. Charles Allen, El Paso, Texas. A form of the Allen cone.

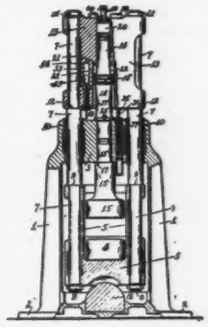
**1,352,423. Casing Head. Paul Arbon, Tulsa, Okla. Filed April 21, 1919.**

A casing head for gas and oil wells having in combination a shell consisting of sections adapted to be detachably secured together, each section having a nozzle and a semicircular projection forming one-half of a third nozzle and each section having one-half of bearings for trunnions, said bearings being arranged with their axes at right angles to the axes of the respective nozzles, and a rotatable valve having a diametrical passage therethrough and a passage or opening extending at right angles from the diametrical passage and having trunnions with their axes at right angles to the axes of said passages or openings, one of the trunnions extending outside of the shell.



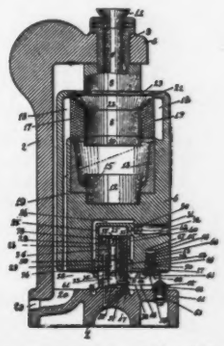
**1,353,096. Stamp Mill. James W. Vanmeter, San Francisco, Cal. Filed June 30, 1919.**

A stamp mill comprising a fixed frame; a mortar mounted on the frame for reciprocative movement; a stamp fixedly mounted in the frame and over which the reciprocative mortar plays to crush the ore by impact against said stamp; a cylinder connected with the mortar; a piston fitted in said cylinder fixed against reciprocative movement; fluid controlling connections to reciprocate said cylinder on said fixed piston; and means carried by the cylinder and actuated by contact with the fixed frame for operating said fluid controlling connections.



**1,353,097. Stamp Mill. James W. Vanmeter, San Francisco, Cal. Filed Nov. 5, 1919.**

An ore stamp mill comprising a frame; guides fitted to the frame; a mortar fitted upon said guides for reciprocative movement, and adapted by the removal of one of said guides to be turned outwardly from the frame upon the other of said guides as an axis; a fixed stamp carried by the frame; and means for reciprocating the mortar to crush the ore against the stamp.



# ECHOES FROM THE FRATERNITY

## McFadden on the Gold Report

### Other Points in His Analysis Presented Before the Annual Convention of the American Bankers' Association

*(Condensed from Authorized Text)*

[*The unfavorable report on the McFadden gold bill, by the committee of the American Bankers' Association, was abstracted on p. 880 of this journal for Oct. 30, and a very brief statement of Mr. McFadden's answer thereto was also given. The following paragraphs present additional points made by him in that reply.*]

In addition to paying the exchange discount, the French Government has imposed a sumptuary tax for the use of gold in the future fabrication of articles (other than money) by law of June 25, 1920, and a further tax on fine gold contained in articles of manufacture since 1873.

The Gold Committee refers to the excise tax proposed as interfering with the free flow of gold into the arts. The excise is to be paid only on the sale of the manufactured article, and not on the bullion, which the manufacturers will receive from the Mint as they always have at the fixed price of $20.67 per ounce. In this way a free gold market is maintained, and there is no interference with the free flow of gold either into the arts or from the arts into the Mint.

The committee's statement: "Increased gold production in a period of low prices and low costs makes it easier for prices to rise again, while diminished gold in periods of high prices and high costs tends to reduce prices and costs again." This is not borne out by the facts. The gold production of the world has declined from $469,000,000 in 1915 to $350,000,000 in 1919, a reduction of 25 per cent in the last four years, and yet prices throughout the world have risen enormously. *The degree of inflation is measured by the ratio of the gold reserve to the volume of the circulating media*, and it must be apparent that *an increase in the gold reserve without an increase in the circulating media would reduce the degree of inflation.* It must also be evident that the effect on prices of the supply of gold in active circulation is relatively small compared with that of the credit currency based on gold which is not "free," but locked up by the Treasury and Reserve Banks and used indirectly as the basis for a larger volume of currency. If this gold were really free and circulating, it could not be so used. The true remedy for inflation is to return the gold to circulation.

The committee has stated that a loss of $22,000,000 occasioned by the increased industrial consumption of gold over the production of new gold is a very small item to the monetary gold stock of the nation. The gold dollar in the vaults of the Federal Reserve Banks may serve as the basis of deposit liabilities of $2.50, and these deposits to the credit of a member bank may in turn serve to enable credit extension by that bank of, say, $19 to $35. With reserves close to the legal minimum, therefore, every million dollars of gold lost to the monetary gold reserve means forced credit contraction of at least twenty millions. The $80,000,000 withdrawn for industrial consumption during 1919 would be equivalent to a contraction in our credit structure of $1,600,000,000. Several of our banks recently pointed out the marked improvement in the money market resulting from the small amounts of gold which have come in from Europe. Is there *some magic difference* between gold imported from Europe and that produced in the United States? These small importations of gold ease our money market but hurt French and British exchange.

In 1915 the United States produced 21.5 per cent of the total world's gold output, and the British Empire 63.7 per cent. In the United States no assistance has been rendered the gold-mining industry. The gold producers of all British possessions receive the benefit of an exchange premium since July, 1919. This year the contribution of the United States to the gold production of the world will probably be not more than 12 per cent, about half of that which it contributed in 1915, while the stimulating effect of the exchange premium will probably increase the quota which the British Empire will contribute to 75 per cent. Whereas in 1915 the British Empire produced three times as much gold as the United States, in 1920 Britain will have produced six times as much. Are we to continue to ignore the problem of gold production in the United States, thus permitting the British Empire to gain an unquestioned supremacy?

## Scientists Discuss the Divining Rod at the Victorian Royal Society

The layman's interest in the divining rod is perennial. It was expressed by Dr. Griffith Taylor, who was responsible for a discussion before the Royal Society of Victoria recently published in the *Queensland Government Mining Journal.*

Dr. Taylor described his investigations of experiments in water-divining at Canberra, whose site lies at the lower end of a valley of a small stream. On either side the valley is a ridge 900 ft. high. At a spot on one side indicated by the diviner a 50-ft. well collected 400 to 800 gal. per day. At a point on the other side the diviner also "divined" an underground stream, but the well driven there proved an absolute duffer. An ordinary hole put down in the middle of the valley by one of the Government engineers drew a plentiful supply for the whole neighborhood. Dr. Taylor doubted only the good sense of the water diviner; ordinary intelligence would have recognized that the valley in a district having an annual rainfall of twenty inches was ideal country for underground water.

Dr. Taylor had the actual divining rod used and demonstrated the way in which the diviner held it. That, in the hands of the diviner, it had "dipped" was beyond question. The rod had creaked in the hands of the big burly miner who held it. His idea was that the divining rod was a subject for investigation on the part of the psychologist rather than the geologist.

In conclusion, Dr. Taylor recalled the famous tests at Guildford, England, in which six diviners failed to discover water, even when standing over: (1) a well-known spring; (2) a sewer; and (3) a small reservoir from which the water was running beneath their feet.

In the discussion Dr. Gilruth and Mr. Carey told of a clergyman in Auckland, New Zealand, who used no rod but asked that no one address him, walked with short steps and held his arms rigid until suddenly affected by some force, when he would act as if he had grasped the terminals of a battery. At this spot he would instruct his client to dig. On two Government dairy farms he had found water twice on three tries.

Mr. Kenyon, of the State Rivers Department, was the only member who admitted that any scientific principle was involved. He pointed out that underground water exists (a) in sheets —sometimes narrowed to channels—not far below the surface, and (b) at greater depth as "artesian" water. Where (a) occurs the atmosphere on still, warm days is so disturbed that a surveyor cannot read his staff at any distance.

It is in this kind of country that the diviner flourishes, and Mr. Kenyon suggested that the atmospheric conditions might possibly affect the supersensitive kind of person who used the divining rod. In country where there was no under-surface water the diviner met failure. In Italy the farmers sought well sites by means of balanced poles or earthenware vessels on which the water condensed overnight. This seemed to give some scientific principle on which to base divining.

The general opinion of the meeting was with Dr. Taylor, that 99 per cent of the diviner's art was related to psychology, and 1 per cent to science—the geologists denying even the 1 per cent, and the "pure" scientist scorning both.

## MEN YOU SHOULD KNOW ABOUT

**J. O. Lewis** is resigning his position as petroleum technologist, U. S. Bureau of Mines, to enter private employment.

**W. J. Uren**, general manager of the Seneca Mining Co., Calumet, Mich., is on a visit to New York City.

*Harris & Ewing Photo*

A. W. AMBROSE

**A. W. Ambrose**, who will become chief petroleum technologist of the Bureau of Mines on Nov. 15, was born at Lockeford, Cal., in 1889, where his early education was obtained. His high school course at Lodi, Cal., was followed by a course in the College of Mining of Leland Stanford, Jr., University, from which he was graduated in 1913.

After leaving college, Mr. Ambrose spent three years in the California oil fields. His work had largely to do with the study of the relation of geology to drilling and production. Later, he spent a year in private employment in the Louisiana and Texas oil fields. He joined the staff of the Bureau of Mines in 1917, and for two years served in Washington as assistant to the chief petroleum technologist. On June 1, 1919, he was sent to the Bartlesville, Okla., station as petroleum engineer. On Feb. 1, 1920, he was made superintendent of that station. He has been summoned from that position to take charge of the Bureau's petroleum work.

**C. W. Purington**, mining engineer, returned to Hakodate, Japan, from the Sakhalin and Okhotsk districts on Sept. 30.

**John G. Flynn**, recently with the Miami Copper Co., Miami, Ariz., has resigned to accept a position as mine superintendent with the El Oro Mining & Railroad Co., El Oro, Mexico, Mexico.

**Fred Searls, Jr.**, who was in Reno, Nev., Oct. 23, left for his San Francisco office the same evening.

**George O. Bradley**, of the engineering firm of Bradley, Bruff & Labarthe, is seriously ill at the Lane hospital, San Francisco, Cal.

**Hewitt O. Fearn**, mining engineer, of Oyster Bay, N. Y., is now at Anyox, B. C., after a summer spent in prospecting in the Northwest.

**Frank G. Stevens**, mining engineer, who has been connected for some years with northern Ontario mining enterprises, is moving to Tepic, Mexico.

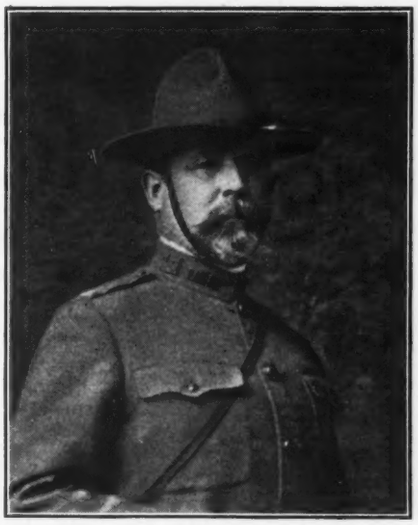
**A. J. McNab**, general manager of the Mason Valley Mines Co., left Reno, Nev., for his New York office on Oct. 21, after a visit to the company's properties in Nevada.

**Jesse C. Scobey**, mining engineer, has resigned his position as assistant to the president of La Luz & Los Angeles Mining Co., of Delaware, but will remain in New York City.

**Dr. Ragnar Liden**, of Stockholm, Sweden, geologist of the Swedish government railroad, is making a study of the clay occurring in the Cobalt district, Ontario, in connection with railway construction.

**Robert Mond**, general manager of the Mond Nickel Co., at Clydach, Wales, recently visited the company's properties in Ontario. He will take a holiday of several months in Canada and the United States, visit the Pacific coast, and later sail from New York City.

**P. K. Lucke**, consulting mining engineer, of Mexico City, D. F., Mexico, left that city for Europe about Oct. 19, and expected to return to Mexico at the end of December. While abroad, his address is care of Institution of Mining & Metallurgy, 1, Finsbury Circus, London, E. C. 2.



COL. G. S. BINCKLEY

**Col. George Sydney Binckley**, who has been on the editorial staff of *Ingeniera Internacional* since November, 1919, resigned his position on Nov. 1, 1920, to resume private practice as consulting civil and hydraulic engineer in Los Angeles, Cal. Col. Binckley commanded the 519th Engineers at home and for a year in France with the American Expeditionary Forces. He plans to resume certain scientific investigations interrupted by our entry into the Great War in 1917.

**William Dunn**, for some time with the Dome Mines Co., is now at the Simon Silver-Lead mine at Mina, Nev., in charge of the construction of the new mill.

## SOCIETIES

**The American Petroleum Institute** will hold its annual meeting on Nov. 17, 18, and 19, 1920, in Washington, D. C. The headquarters and the sessions will be at the New Willard Hotel, 14th St. and Pennsylvania Ave., N.W.

**American Engineering Council of Federated American Engineering Societies** will hold its initial meeting on Nov. 18, 19, and 20, at the New Willard Hotel, Washington, D. C. The full program of this important meeting was published Sept. 25 on p. 633 of this journal.

**The Mining & Metallurgical Society of America** will give a dinner to E. A. Cappelen Smith at the Hotel Commodore on Nov. 10, at 7 p.m. The occasion is the presentation to Mr. Smith of the society's gold medal for distinguished service in the art of hydrometallurgy. Members of the society, the ladies of their families, and their guests are specially invited to attend. Reservations ($5 per plate) are made with C. A. Rose, 120 Broadway, New York City.

## OBITUARY

**George M. Richards**, mining engineer, of 28 West 46th St., New York City, died at New Brunswick, Canada, on Oct. 12. He was buried at Woodlawn Cemetery, New York, N. Y., on the 17th.

**Richard Lamb**, consulting engineer, of 90 West St., New York City, died in hospital on Oct. 18 after a short illness, at the age of 61. He was a native of Norfolk, Va., a graduate of Brown University, and a member of several engineering societies, notably of the American Road Builders' Association. He was an authority on highway engineering and the engineer of a number of notable works. In the mining field Mr. Lamb took the leading part in opening the Virginia Copper Co. mine at High Hill, Halifax County, Va., erected its plant, and designed a plant for the electrical extraction of copper from ore. Mr. Lamb also designed an electric testing plant on the Erie Canal. He was buried at Brooklyn on Oct. 20.

# THE MINING NEWS

The Mining News of ENGINEERING AND MINING JOURNAL is obtained exclusively from its own staff and correspondents, both in the United States and in foreign fields. If, under exceptional conditions, material emanating from other sources is published, due acknowledgment and credit will be accorded.

WEEKLY RÉSUMÉ

*It is reported that Henry Ford will open the Imperial iron mine on the Marquette Range in northern Michigan that he recently acquired by purchasing the holdings of the Michigan Iron & Land Co. Minnesota and Wisconsin iron country men are said to be interested in the newly organized Milton Development Co. that has been formed to develop certain iron ore lands discovered in Columbia County, Ore. Control of the old Ohio & Colorado smelter at Salida, Col., has been obtained by Everly M. Davis, of New York, who, it is said, intends to reopen and operate this plant on local ores. On the Comstock Lode in Nevada the management of the North End Mines has announced that beginning Jan. 1 wages will be cut to $5 per day, which will permit operation of the mines of the company, all of which excepting the Con. Virginia are at present shut down.*

*In Canada, the employees of the Asbestos Corporation in Quebec have struck for higher wages and recognition of their union. Power shortage continues to hamper operations in Cobalt. La Rose's head frame and shaft house were recently burned at this Ontario camp. In British Columbia, Granby Consolidated is reported to have dropped its option on the Ecstall copper property.*

## Henry Ford To Operate Imperial Mine on Marquette Range

### Property Included in Holdings Recently Acquired—1,000,000 Tons Blocked Out—Shut Down Since 1911

Henry Ford is to open the Imperial mine at Michigamme, Mich., on the Marquette Range, which recently came into his possession when he purchased the large holdings of the Michigan Iron & Land Co. Mr. Ford looked over the property a few days ago with his mining engineer and metallurgist and a decision was made to commence mining at once. The Imperial was first opened in 1882 and was closed down last in 1911. It was formerly operated by the Cleveland-Cliffs Iron Co., the latter concern surrendering its lease on April 1, 1919. The mine is well equipped with a steel head frame, engine and boiler houses, shops, change house and coal dock. The workings are quite shallow, being only 200 ft. in depth, and it will require but a short time to unwater them. The state tax commission estimates 1,000,000 tons of ore developed, but it is certain that much more than this exists on the property. The ore is a limonite, carrying from 50 to 52 per cent iron, low in sulphur and high in phosphorus. The moisture is very high. This is Henry Ford's first entrance into the iron mining business, but he has other mineral lands which might hold iron ore, and his work will be watched with interest by the mining men of the Lake Superior district. At present there are no active mines in the Michigamme field.

## Governors of Zacatecas and Durango Define Attitude Toward Mining Industry

### "Durango Perfectly Safe," Says Castro; Favors Erection of New Smelters—Governor Moreno for Taxation of Mines in Proportion to Output

SPECIAL CORRESPONDENCE

Jesus Augustín Castro, governor of the state of Durango, Mexico, and Donato Moreno, governor of Zacatecas, were recently interviewed by the correspondent of *Engineering and Mining Journal*. Both executives freely discussed the mining situation within their respective states and told of the steps contemplated to aid this important industry.

The state of Durango is perfectly safe today, in Governor Castro's opinion. "Any delay in resuming the operation of mines is not justified," he said. Upon being asked if he was disposed to use his influence to facilitate railroad transportation of machinery and supplies to mining camps he replied:

"I have so decided and have already taken up the matter. I have called the attention of the Federal Government to the resumption of traffic between the state of Durango and the United States via the old International Railroad, thus getting through communication from here to San Antonio, if necessary, without the long and tiresome detour by Saltillo and Monterrey."

Governor Castro said that his policy will be to facilitate the installation of as many smelters in the state as may be necessary to permit the miners to sell their products under non-prohibitive terms. He was asked if he thought it well to call upon foreign investors, in view of the national lack of capital for large mining ventures, with the understanding that all investments made in the country shall be subject to the laws of Mexico. He replied:

"I believe that an active propaganda should be started in order to evidence the unlimited mineral resources of the state of Durango, practically undeveloped up to the present time. My idea is to establish a statistical mining department in the state, to work either alone or in conjunction with the industry department of Mexico City; mining and geological explorations will be thus conducted all over the state, the results to be published for the sake of information to all mining investors.

"The government of the state of Durango is entirely disposed to grant all necessary protection and facilities for mining exploration and exploitation within the statutory provisions."

Asked as to the construction of railroads to mining camps, Governor Castro said: "The government of the state should never hesitate to co-operate in the reorganization of all railroad schemes already existing or that may be proposed in the future."

In regard to mining taxes in Durango, he said:

"I have no definite plan as regards the tax on mineral extraction; but referring to taxation, in general, my idea is to try a better distribution of the burden among the tax payers, so as to be able to diminish the taxes to a just amount."

The question was asked the Governor whether he favored the organization of a Chamber of Mines within the state. He replied:

"As I understand that a mining chamber would have for its object to promote, safeguard and harmonize all mining interests, it would thus co-operate with the Government, and, of course, I should support it."

VIEWS OF THE GOVERNOR OF ZACATECAS

"Zacatecas is one of the richest mining states in the Republic," said Governor Moreno, "developed for years only in its northern part. Operations were conducted on a large scale at a time when old treatment processes were still in use; the low silver price made possible the extraction only of high-grade ores, and as these were not found in depth, operations had to be shut down. Lack of transportation facilities and high freight rates also contributed to the suspension of work in the mines; but now that mining and treatment processes have improved some plans have been outlined for the resumption of operations in properties where enormous tonnage of low-grade ores is found. Under this scheme old dumps could be worked and treated. Following this general plan, operations have already been started in Fresnillo, Ojocaliente, Zacatecas, Sombrerete, Pinos, Nieves and Mazapil."

As to encouraging mining operations, Governor Moreno said:

"First, I will grant the mining companies the maximum facilities falling within the jurisdiction of the state, and at the same time I will take up with the Federal Government all matters

bringing a benefit to the mining industry. This would be easy to accomplish in view of the political solidarity already existing between the states and the Federal Government. Furthermore, I am discussing right now with the Geological Institute of Mexico City and with the Department of Industry and Commerce, the creation of a permanent Geological Survey Commission in the state, which will supply both the mining companies already operating and prospective mining investors with important information at no cost; this commission will start working on the exploration of southern Zacatecas.

"Few of the mining companies in Zacatecas are working now but they are all of importance. The country has just entered upon a period of peace indispensable for the prosperity of the Republic. Some well known mining investors in the state are feeling enthusiastic about the situation, and this Government has reasons to hope that within a year mining operation will reach their maximum activity."

As to mine taxation Governor Moreno said:

"This government, not only in regard to taxes on mineral extraction, but also to taxation in general, intends to follow a scheme of proportionate rates; in this manner the small and large producers will bear taxes in just proportion to their output, and the exploring outfits would not have to pay any taxes until they enter into a stage of production."

Governor Moreno is disposed to facilitate the study, location and construction of mining railroads. He said:

"Necessary influence will be exercised with the federal government for such a purpose; something about it has already been discussed by the representatives of Zacatecas in Congress, who support our projects and who are assisted by the attorneys for the state in Mexico City. Both in regard to this matter and to mining operations, this government intends to give fair assistance to all concerned with a view to securing the general prosperity of the state and nothing else."

The Governor was further asked what was the program of the Government as to the matter of assisting mining, principally in cases where operations are paralysed owing to internal difficulties of the corporations. He replied:

"If I understand this question, I might say that, referring to shut downs caused by troubles between capital and labor, this government has just enacted provisions creating the labor department with representatives in all the mining camps of the state. This department will conduct an intense propaganda against the nefarious activity of agitators, and at the same time will attempt to harmonize the tendencies of all parties following a program outlined by this government. So far, we have been successful, and I am sure that mining operations will not be hindered by conflicts between labor and capital; due to the importance of this matter it has deserved our preferred attention."

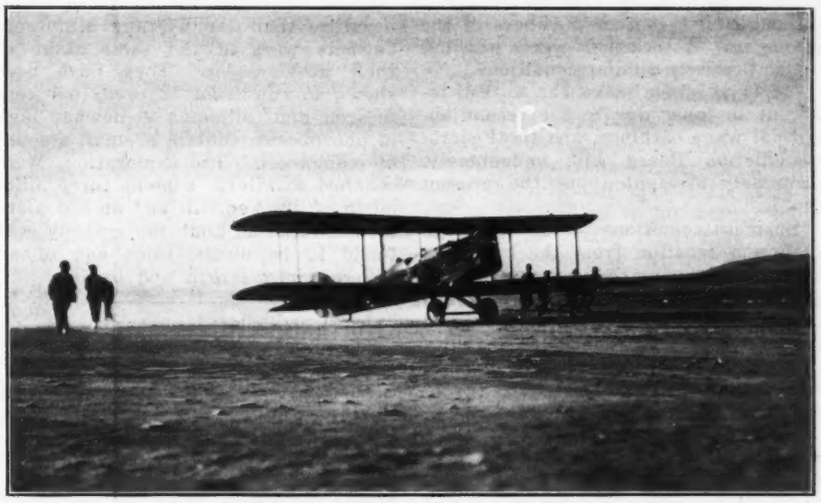
The government of Zacatecas is disposed to use all its influence so that the railroad companies would grant all necessary transportation facilities to the miners in the state. "This matter is of such a capital importance," said Governor Moreno, "that it has already been taken up with the President of the Republic; also the President-elect, Mr. Alvaro Obregón, knows about it, and I presume that all effort is being made in order to supply the National Railroads with necessary rolling stock, the lack of which is causing a crisis in the country and has been a decisive factor in the increasing high cost of living.

"The state government will encourage the organization of a mining chamber in Zacatecas," said Governor Moreno. "The organization of chambers, either of commerce, of agriculture or mining is considered by us as of essential significance, provided they accomplish their end; namely, the regulation of production, of imports and exports, the supply of working capital and implements, and even the regulation of minimum salaries in all centers of production."

## Mexican Coal Strike Threatens To Close Large Companies

### Eight Thousand Men Involved—Neither Side Giving Way—Arbitration Refused—No Violence

The particular cloud now on the mining horizon in Mexico is the labor muddle in the coal fields of the north. The strike for an increase of from 100 to 300 per cent in wages, recognition of the unions and a dozen other demands has reached an acute stage and the pumps and fans in several of the more important mines have been stopped and the properties are filling with water. Efforts on the part of the government to induce the men to return to work pending the appointment of an arbitration board have been fruitless. Neither side appears disposed to give ground. About 8,000 men are concerned in the strike and as they have no funds a great deal of suffering is already reported. The government has undertaken to supply the men and their families with the necessities of life. The trouble seems to have been started by professional agitators outside the coal fields, mostly foreigners, soviets and I. W. W. representatives from the United States. Dodgers are being circulated urging the men to seize the properties and work them on their own account. Unless a settlement is reached there will necessarily be a general closing of all mining and industrial plants in the north, as well as railway transportation, as they depend almost exclusively on the native coal output. Minerales y Metales and the American Smelting & Refining Co. have notified the government that they will not be able to keep their smelters and mines operating longer than a week unless they get coal. No violence of importance has been reported, and the fields are in charge of Federal troops.



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ARMY AIRPLANE ARRIVING AT NOME, ALASKA, AFTER TRANS-CONTINENTAL FLIGHT

## E. & M. J. Receives First Letter Brought by Airplane From Alaska

The accompanying photograph of the army airplane finishing its great transcontinental flight at Nome, Alaska, on Aug. 23, was brought to New York by the same airplane on its return flight in a letter mailed to the *Engineering and Mining Journal* by Donald E. Campbell, mining engineer of Nome. The letter to the *Journal* is therefore the first to have been brought by airplane from Alaska to New York. It left Nome Aug. 25 and owing to various delays on the homeward trip did not reach New York until recently. With it came two copies of the *Daily Telegraph Bulletin*, published at Nome.

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Cie du Boleo, Baja California, produced 440,720 lb. copper in September.

## Asbestos Corporation's Employees in Quebec Called Out

### Recognition of Union and Wage Increase Demanded—Business Conditions Changing

The asbestos industry in Quebec is experiencing a period of intensity which has been absent during the prolonged period of rising prices and labor inactivity. The culminating issue has apparently been projected when by reason of contracting business conditions the companies have been unable to meet the ever increasing demands of labor. An embryo managers' association had been formed to meet like emergencies, but evidently the original instinct characteristic of the operators in the camp prevailed and a single operator has been allowed to bear the onus of the combined attack of the labor forces. On Oct. 11 a strike was declared by the National Union against the two mines of the Asbestos Corporation, demanding recognition of their union and a wage increase of 12½ per cent. The corporation pointed out their inability to comply with the request, but in spite of their representation and the efforts of the Labor Delegate from Ottawa, the strike was declared against the corporation alone, although all the other members of the Managers' Association were working under precisely similar conditions. No issue is at stake, save the unrest inherent in labor due to the recent abnormal wage earnings, and the Federal Conciliation Board will, undoubtedly, ultimately straighten out the present tangle.

Business conditions in the camp are feeling a reaction from the buoyancy experienced during the past three years. The European markets have been looked upon as the absorber of our increased production but the continued inability of foreign countries to adjust their most basic industries increases the probability of these expected markets being deferred for some time to come; in the meantime, however, the present avenues of consumption are fully capable of maintaining the industry on a sound basis of production. For the present year shipments have been steady and should make a substantial increase over last year's total of 135,000 short tons of asbestos.

The Weiser interests are contemplating the erection of a 350-ton mill on their "Reed Mine" property. H. R. Lynn has been engaged to build the plant. The Bennett-Martin Mines at Vimy Ridge, Coleraine, are pushing the construction of the six-mile siding connecting their mines with Coleraine Station on the Q. C. Ry.

Herr Becker of the firm Becker & Haag, Berlin, Germany, importers of raw asbestos, made his initial visit since the termination of the war. Thomas Lloyd, for the past seven years with Bell Asbestos Mines, has resigned to accept a position as superintendent of the B. C. mines of the Asbestos Corporation, Limited, in the Black Lake district.

## Oregon Iron Lands Taken Over by Milton Development Co.

### Two Deposits Found in Columbia County—Minnesota and Wisconsin Men Interested

Two deposits of iron ore are reported to have been found in Columbia County, Ore., six miles apart on properties controlled by C. A. Finley and others, of Portland. J. L. Washburn, president of the Northern National Bank, of Duluth, and John Z. Williams, a Duluth attorney, have become interested in these, together with Henry Turrish, of Eau Claire, Wis., interests who own and operate a logging railroad and conduct logging operations in that district. The Milton Development Co. has been incorporated with a capital stock of $200,000 for the purpose of taking over the holdings of the interests headed by J. L. Washburn and Henry Turrish and to determine the extent of the formations through development work. Investigations of the deposits have been made during the last year by J. W. Flannery, of Cleveland, Ohio, and A. M. Martin, of Chicago, who, it is claimed, are satisfied that the deposits are of considerable extent. The ore is claimed to be in blanket formation and richer in brown hematite than the average Minnesota deposits were at the same stage of their development. They have been shown to run from 52 to 59 per cent in iron and, although somewhat high in phosphorus, contain a small amount of manganese. The explorations were confined mainly to a point three miles north of Bunker Hill and at one place it was reported that the orebody was found to be 60 ft. thick and of an undetermined length and breath.

## North End Mines on Comstock To Reduce Wages Jan. 1

The wage scale now in effect at the North End Mines in Virginia City, Nev., will be reduced to $5 per day on Jan. 1, 1921, according to an announcement made by Alex Wise, superintendent. When the miners went on "vacation" Sept. 5, following a demand for $6 a day, the North End Mines were the only ones to accede. In notifying the men that the advance was to be withdrawn Mr. Wise said:

"The old wage scale in vogue at the North End Mines prior to Sept. 5 must be put into effect as soon as possible in order that other properties under my management, other than the Con. Virginia, may be placed in operation again, which under the present scale is not possible; also that other properties along the lode may be able to resume work.

"In view of the general conditions throughout the country showing a downward trend of all commodities entering into the cost of living, I believe the new wage scale to be put into effect will work a hardship on no one, and create at least four or five times the present opportunity for employment along the Comstock lode."

## Queensland State Mining Ventures Suffering Checks

### Proposal To Erect Iron and Steel Works at Bowen, Costing £3,000,000, Gets a Setback

*From Our Special Correspondent*

Brisbane, Sept. 6—The State enterprises of the present Queensland (Labor) Government, as far as they relate to mining, are suffering some checks, and the failure of the Premier to get a loan from the British capitalists, intended largely to prosecute these enterprises, is to result in a general election, which is expected to take place in October. The biggest thing that has received a setback is the proposal to erect State Iron & Steel Works at the northern port of Bowen, at a cost of something approaching £3,000,000. A good deal of money has been already spent in preparing for this venture, and at the present time the government are testing a large deposit of iron ore on the northwest coast of western Australia, over which they hold an option (that cost £3,000) to purchase at £30,000. As this option will expire in October, and as it is doubtful whether the Queensland iron ores alone are good enough or extensive enough to warrant the carrying out of the big works, the government must be in a quandary as to just what they can do.

The State Battery at Bamford, in the far north, that was established to assist in the mining of the rare metals, is now closed down owing to the fall that has taken place in the price of molybdenite and wolfram. As the battery is now equipped for the treatment of tin also, and as the market value of this metal is keeping up, the suspension is not likely to last long.

The Chillagoe State Smelters, which together with the Chillagoe and Ethridge Railways and some mines, were purchased by the Government from the Chillagoe Co., have shown a small profit for six months' work, but a much better showing would have been made had it not been for an insufficient supply of ore to keep the works going at their full capacity. This was really the trouble when the Chillagoe Co. closed down several years ago, but there is no doubt the mining industry of the district suffered much while the works were lying idle.

As far as the Government's coal prospecting or coal mining ventures are concerned, they are looking promising. There is no question they have a splendid coal area on the Bowen field, 60 miles inland from Bowen, and the colliery will be ready for a large output as soon as the railroad being built from the port reaches the field. This coal will be a great benefit to the northern parts of Queensland, and is of course also intended for the iron and steel works if they are ever built. Some 300 miles further south, at the Styx River on the coastal railway, the Government has proved by means of boring and a shaft some of the best coal in Australia, and are selling enough to pay the cost of prospecting.

The shaft got into very faulty country, but further prospecting has disclosed a more settled locality, where profitable operations are now likely to be carried on. On the Dawson River, inland from Rockhampton and Mount Morgan, the first coal mined proved, on trial, to be unsatisfactory, but a 7-ft. seam of exceptionally good quality has now been struck. This field is connected by rail with both Rockhampton and Mount Morgan; from the former place it is inland about 60 miles.

On the whole, the coal mining industry of Queensland has of late been showing signs of expansion. Last year's output was nearly 1,000,000 tons, and that for the first half of the present year was greater than that for the like period of 1919. The value at the pit's mouth ranges from 12s. 6.6d. per ton in the south to 17s. 8d. in the north.

## New Railroad To Be Constructed to Guanaceví, Durango

### Contract With State Also Provides for Erection of Smelter

Officials of the state government of Durango, Mexico, recently signed a contract with Smith Bros. for the construction of a railway from Santa Catarina Tepehaunes to the mining camp of Guanaceví, and the erection of a smelter in the latter camp, at a total cost of $20,000,000. The government guarantees 6 per cent interest on bonds to be issued for this work, for a period of twenty years. Surveys are to be completed within ninety days and the entire work must be finished, according to contract, within two years. Immediately upon signing the contract the representatives of Smith Bros. left for the City of Mexico to secure the approval of the Federal congress and President.

## Delinquent Mining Claims in Ontario Declared Forfeit

In a recent issue of the *Ontario Gazette* was published a list of 1,900 mining claims which reverted to the crown because of the non-payment of the acre tax under the Mining Act of Ontario. Under the Mining Act a tax of 5c. per acre per year is levied against all mining property in an unorganized district. Through oversight, or possibly in part, on account of negligence in the Mines Department, a large number of companies and claim owners had neglected this tax, and the special order-in-council throwing the claims open for re-staking came as a big surprise.

Included among the properties thrown open was the Teck-Hughes in Kirkland Lake, on which over $1,000,000 has been spent, and which has a 100-ton mill. There was a big scramble to restake this property, together with other properties which were believed to be valuable, but fortunately, at the last moment, a number of the more important properties were withdrawn by the government from re-staking.

## Will Reopen Salida Smelter To Treat Colorado Ores

### Everly M. Davis, of New York, Secures Control of Plant—Another Project To Ease Smelting Situation

Confirmation of the conclusion of the negotiations by which the old Ohio & Colorado smelter at Salida, Col., has passed into the control of new interests, represented by Everly M. Davis, of New York, a prominent mining operator, identified with the financing and development of the Rawley mine at Bonanza, Saguache County, has just been received at Salida. The smelter, which is equipped with a lead stack, after being owned by various interests, passed to the control of the American Metal Co. and was operated by it for several years. Owing to the reported shortage of the available supply of suitable ore, the smelter was closed down about two years ago and was subsequently sold at auction to Morse Brothers, of Denver, for the purpose of wrecking and dismantling to secure the equipment and material for sale as second-hand material. Plans were made for dismantling the plant when Mr. Davis appeared and made contracts with Morse Brothers, which it is understood will shortly result in the full resumption of operations. As an accessory to the project, it is proposed to build a seven-mile aerial tram from the Bonanza mine to Shirely station on the narrow-gage branch of the Denver & Rio Grande Ry., near Mears Junction, about twelve miles from Salida. The Rawley mine has positively developed, according to the company's report, 89,843 tons, averaging 8.89 oz. of silver, 2.35 per cent copper, 8.98 per cent lead, and 189,810 tons, averaging 10.9 oz. silver, 3.25 per cent copper, 0.3 per cent lead. The probable ore is estimated at an additional amount in excess of 560,000 tons. The company has been carrying on an extensive development for a number of years, the total footage amounting to 13,843 ft. Various plans to realize on this work have been delayed by financial conditions and the excessive cost of equipment and of operation. It is proposed to use the ore of the Rawley mine as a basis for the supply for the smelter and also to provide capacity to take care of additional Colorado ore which has been going to other Colorado smelters or to Salt Lake City. A considerable tonnage of low-grade ore is known to be available, which was not profitable to ship to other points than Salida. The increase in freight rates has further limited the shipment of ore from Leadville, in the San Juan district, and will result in increasing the supply for the Salida plant. This is considered the most important transaction affecting mining which has taken place this year.

Another project to ameliorate the smelting situation in Colorado and to meet the present conditions is being developed in connection with a power project on the Gunnison River above Lake City, in Hinsdale County. Denver and New York interests have secured an option from the Reynolds-Stearns Co. on the water power rights on the South Fork and propose to establish at Lake Cristobal a plant which will provide from 8,000 to 10,000 minimum horsepower. The estimated installation cost is about $125 a horsepower, which would permit of the surplus power being utilized for electrical smelting of the zinc-lead ores of Hinsdale County at a cost which, it is expected, will be much less than the prevailing smelting rates plus the present freight rates. This power and smelting project is being developed by L. F. Hulen, a Denver capitalist, who was identified with the western Nebraska potash developments during the war, and who recently has taken an option on the Golden Fleece mine, at Lake City, and has spent a large amount of money in exploration work and development thereon. Investigations of the methods of electrical smelting are now being made, and the consideration of the situation as regards actual and prospective ore supply. The general plan contemplates participation by mine-owning interests, which matter is now being worked out. If electrical smelting is found practical in this locality it is likely that other similar development in the San Juan district and elsewhere in Colorado will be undertaken.

## Drilling Contest Held at Baxter Springs, Kan.

A. Abbott and A. E. Mitchell, representing the Hunt Mining Co., captured the championship of the Tri-state district for drilling in an annual contest staged at Baxter Springs, Kan., on Oct. 20. Using a Denver Turbro drill they drilled through a concrete block 6 ft. in thickness in 4 minutes, 26½ seconds, this time including the set-up and knock-down of their machine. They won a prize of $100 and the temporary ownership of a $75 loving cup.

Harold Miles and Fred Vickery, representing the Premier Mining Co., were second and only one second behind the winners, and there was some questioning of the judges' decision as to whether the winning team had completed the knocking down of their tripod when time was called. Miles and Vickery were the winners a year ago.

The contest was well attended, especially so on account of the shutdown of mines which made it possible for almost all the miners to be on hand.

## Northwest Mining Association Elects

The Northwest Mining Association elected as its new board of trustees: Frank A. Ross, Frank C. Bailey, F. M. Smith, G. B. Dennis, Oscar Cain, Lehigh Nicholas and W. H. Linney. A communication urging support of efforts being made to obtain a readjustment of freight rates on bullion was received from the Colorado Metal Mining Association. The secretary was instructed to reply that the Northwest Association would give all possible aid.

## Special Utah Power Contracts Declared Void

**Order of State Public Utilities Commission Effective from Oct. 22—Companies To Appeal to Federal Courts**

Special contracts between large users of power in Utah and the Utah Power & Light Co. that were entered into several years ago, in fact before the creation of the Utah public utilities commission, have been declared by the commission to be void, and such users of power placed by the commission, beginning noon, Oct. 22, on the standard rates prevailing in general. The commission has for some time been going into the matter of rates, and has held hearings at which companies protesting against increased rates and the abrogation of contracts have been appearing to plead their cases. These companies have been taking the position that the commission has no jurisdiction, and that contracts, lawful when made, should under the state and Federal constitution be held inviolable against interference by legal authority. Protesting companies have indicated that the matter will be taken to the Federal courts. A large number of mining companies are naturally effected by the ruling of the commission. The Utah Copper is the largest single user of power in the state, in some years having taken more than fifty per cent. of the power generated by the Utah Power & Light Co.

## To Hold Flotation Conference at Denver

At the Twenty-third Annual Convention of the American Mining Congress to be held in Denver, Nov. 15-19, 1920, the committee on flotation will make a report covering the activities of the American Mining Congress and the Federal Trade Commission during the past twelve months, in the inquiry now being made relative to the contests between Minerals Separation, Ltd., and the users of flotation. The committee will include: George E. Collins, mining engineer, Denver, Col.; Philip Argall, metallurgist, Denver, Col.; T. A. Rickard, editor of the *Mining and Scientific Press*, San Francisco, Cal.; E. E. Paxton, president of the Engels Copper Co., San Francisco, Cal.; R. M. Henderson, president of the Wellington Mines Co., Breckenridge, Col.; J. M. Callow, president of the General Engineering Co., Salt Lake City, Utah; and G. W. Lambourne, president of the Daly-West Mining Co., Salt Lake City, Utah.

## Good Weather Facilitates Lake Superior Ore Shipments

Iron ore shipments from the Lake Superior districts during 1920 will total 58,000,000 tons, according to estimates given by *Iron Trade Review*. Shipments to Nov. 1 were approximately 52,953,000 tons, and with the continuation of favorable weather conditions it is expected that an additional 5,000,000 tons will be shipped during November.

Prospective slackening of furnace operations has dissipated the fears which several of the operators expressed regarding the possibilities of their being able to make adequate deliveries. Ore contracts will not be filled, but the demand is less urgent. While two leading furnace interests in the East had but a few weeks' supply on hand a month ago and then were seriously concerned, especially in regard to the lack of cars to haul ore from the Minnesota open-pit mines to the docks, general improvement in shipping facilities, coupled with the present outlook in the pig iron market, is responsible for a more assuring attitude.

## Power Shortage at Cobalt, Ont., Causing Mines to Curtail

Owing to a shortage of hydro-electric power, due to an exceptionally dry season, most of the Cobalt mines are curtailing their operations to some extent. So far this is mostly in the cessation of re-treatment of sands and work which could be cut off without interfering with production to any extent. Unless conditions materially improve, however, further reduction in power consumption will be necessary. So far this year there has only been 19 in. of rainfall compared with 35 in. for the corresponding period of the previous year, and the water in all the lakes and rivers is lower than has ever been known before.

The shortage of power applies equally to Kirkland Lake and Porcupine and the operators in the Sudbury district are also suffering.

## Baja California Vanadium Deposits To Be Developed

The Baja California Vanadium Co. has been recently organized to develop and operate certain calcium vanadate deposits of Lower California. These deposits are situated five kilometers from tide water at Angeles Bay on the Gulf of California. They consist of large lenses of gypsum and calcium vanadate in a reddish shale.

Picked specimens of the calcium vanadate analyze from 40 per cent to 45 per cent vanadium pentoxide. The general tenor of the material in the lenses is a little over 5 per cent vanadium pentoxide. The lenses vary considerably in size. The principal one is 900 m. long and 450 m. wide. The deposit has not been explored to any extent vertically. The deepest shaft is but 25 ft. deep. Practically all work has been done in open pit thus far. In addition the enclosing shales contain up to 2 per cent vanadium pentoxide. The red shales cover a large area.

Tests for metallurgical adaptability have been conducted in the rare element laboratory of Will Baughman, of Los Angeles. The ore does not contain phosphorus, arsenic or other detrimental element and lends itself readily to extraction methods.

The deposit was discovered last spring by Leland Devine, who with A. I. Meyers succeeded in interesting backers for the project, and if present plans mature the company will commence operations this winter.

## Bounty on Canadian Iron Ores Again Asked

The Canadian Tariff Commission at a sitting in Fort William recently received memorials from the Fort William and Port Arthur Board of Trade favoring the payment of a government bounty for fifteen years on all Canadian iron ores mined and marketed. The Port Arthur Board of Trade asked for a bounty of 50c. per ton but the Fort William petitioners thought that anything less than $1 per ton would be of little use in inducing proprietors of iron mines to develop their properties. It was agreed by all that the bounty should be paid to the producer of the iron ores and not to the smelters, as the latter system had been tried and proved a failure.

At the sittings of the commission at Sault Ste. Marie, Ont., on Oct. 18, the Board of Trade of that city asked for a bounty of $1 per ton on iron ore produced in Canada for fifteen years. President W. C. Franz of the Algoma Steel Corporation expressed the opinion that considerable development would take place if such a bounty were given to the miners. He thought that further prospecting of the iron ranges would bring to light other deposits of merchantable iron ore, which could go directly to the blast furnaces without previous treatment.

## Indian Office for Miami, Okla.

Cato Sells, Indian Commissioner, has announced the establishment of an Indian office at Miami, Okla., to supplement the office that has been maintained for a number of years at Wyandotte, Okla. Mr. Sells states that it is impossible to carry on the work of the district at the Wyandotte office with the efficiency desired, owing to the vast amount of added work that has come about through the discovery of zinc and lead on the lands of the Quapaws, near Picher, Okla.

## Blue Sky Law Proposed

A brief on blue sky legislation has been prepared by the mining bureau of the Spokane (Wash.) Chamber of Commerce, of which F. W. Smith, smelter director of the Bunker Hill & Sullivan Mining & Concentrating Co., is chairman. Although opposing the state blue sky legislation contained in the Frawley bill, the brief advocates the enactment of a Federal law providing that full information shall be filed in the originating state of the corporation and at Washington, D. C.; also it provides for the automatic opening of all states to a promotion when it has been passed on by Federal authorities at Washington.

# NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

## To Expand Co-operative Work of Bureau of Mines

### Investigations Conducted for State Institutions and Private Companies Yielding Good Results

Owing to the favorable results following the co-operative agreements entered into by the U. S. Bureau of Mines with state institutions and private companies it is intended to encourage this kind of work. In fact, a very important development along those lines is expected. At present the Bureau's appropriation is supplemented by more than a half million dollars annually. It is believed that this amount can be greatly increased to the advantage of private industry and to the public. An example of the co-operative agreement with private companies is that with the Northwest Magnesite Co. The purpose of the co-operation in this case is to conduct an investigation as to the best method of producing high-grade caustic-burned magnesia. The work is to include a study of the calcination of magnesite from the property of the Northwest Magnesite Co. with a view to determining the most favorable conditions as to time and temperature of calcination for the production of caustic magnesia yielding the best hydrochloride cement; a similar study of magnesite from various California and other properties; and a study of the various methods for judging the quality of caustic magnesia for the production of oxy-chloride cement.

The advantages to the public of the investigation would be that if domestic magnesite is found suitable as a plastic flooring material it will make the United States independent of foreign supplies, particularly from Greece, Mexico and Venezuela. It will tend to cause the development of this natural resource on a larger scale and may lead to the larger use and conservation of magnesium chloride, which is an essential ingredient in making plastic flooring cement. Magnesium chloride is produced in connection with the manufacture of salt by solar evaporation, but now goes entirely to waste.

The advantages to the Bureau are that it will increase its first-hand knowledge of the quality and the possibilities of domestic magnesite. It will give the Bureau certain fundamental but little known data. It will bring the Bureau in touch with an important group of mining men on the Pacific coast and is likely to convince them that the Bureau of Mines is able to attack practical problems and to assist in their solution. Since the Federal Government does more construction work than does any other single agency in the United States, it has a very direct interest in this cement which is being adapted so successfully to the construction of floors.

Typical of the co-operative agreements with state institutions is that with the University of Idaho and the Idaho Bureau of Mines and Geology. The purpose of the co-operation in this case is to disseminate further information with a view to improving conditions in mining, metallurgical and other industries, safeguarding life among employees, and preventing unnecessary waste of resources.

Due to their complexity, the treatment of ores from the Cœur d'Alene district has long presented a metallurgical problem. The Bureau of Mines has recognized the importance of devising ways and means for recovering a larger percentage of the values from those ores. Through co-operation with the state institutions and with the operators of the Cœur d'Alene district, the Bureau has been able to carry on an investigation which would have been impossible otherwise, owing to lack of funds. Through the co-operation with the University of Idaho, the Bureau of Mines has had the advantage of office room, laboratories, milling machines and other facilities, gratis. This co-operation has been in progress for nearly four years and has opened the way for much more extensive work.

At present the Bureau of Mines has in effect co-operative agreements in which the outside agencies contribute a total of $512,800. These agreements are with the following agencies: Sewalls Point Coal Exchange, Trent Process Corporation, Miami Copper Co., Monongahela Valley Traction Co., Panhandle Oil Co., American Society of Heating and Ventilating Engineers, Southern Pacific R.R., Sinclair Refining Co., Puget Sound Traction, Light & Power Co., Pope-Shenon Mining Co., Ocotillo Products Co., Northwest Magnesite Co., National Tube Co., The Koppers Co., Erie City Iron Works, Mid-West Refining Co., Welsbach Co., Vanadium Corporation of America, Chamber of Commerce of Bartlesville, Okla.; War Department, Bureau of Standards, Carnegie Institute of Technology, Colorado School of Mines, Primos Chemical Co., Salt Lake City and University of Utah, Illinois Geological Survey, University of Illinois, University of Arizona, University of Washington, University of Idaho, Idaho Bureau of Mines and Geology, University of Minnesota, Cornell University, Colorado School of Mines, Ohio State University, New York-New Jersey State Bridge and Tunnel Commission, State of New York, Industrial Commission of Utah, State of New Jersey, Pennsylvania Geological Survey, Oregon Bureau of Mines and Geology, State of Oklahoma, State of Colorado.

## Survey's Copper Specialist Back from Western Trip

### H. A. C. Jenison Reports Labor Problems To Be Serious in Various Copper Mining Districts

H. A. C. Jenison, the copper specialist of the U. S. Geological Survey, has returned from a visit to several of the copper-producing areas in the West. In addition to the depression due to the poor copper market, Mr. Jenison finds that copper mining in the West is struggling against a very serious labor problem. Even with the high wage scale now in effect the mines are finding it impossible to compete with Eastern industries. The greatest difficulty is being experienced in securing skilled operators. The increase in freight rates has added materially to the difficulties of the Western copper producers, Mr. Jenison says. He reports that plans are now well advanced looking to the shipment of concentrates and metal to the Pacific coast for transshipment through the Panama Canal to the eastern seaboard; in fact, shipments have already been made by the Granby and Anaconda copper companies.

## Standardization Committee Will Meet in New York

With the idea of evolving something more definite in the matter of standardization of mine practice and equipment, the American Engineering Standards Committee is planning a meeting in New York Nov. 11. It is expected to formulate a report which can be presented at the convention of the American Mining Congress in Denver. The American Institute of Mining and Metallurgical Engineers, the American Mining Congress, the Mining and Metallurgical Society of America, the National Safety Council and the Bureau of Mines have been asked to name two representatives to form a sub-committee to assist in the work.

## War Mineral Awards

Awards in war minerals relief claims made during the week ended Oct. 23 have been announced as follows (the name of the claimant, the mineral, the amount recommended, and its percentage relationship to the amount claimed, are shown): Benjamin F. Steacy, chrome, $640.12, 32 per cent; Carolina Chrome Co., chrome, $5,376.46, 25 per cent; A. H. Jarman, chrome, $70,288.45, 51 per cent; United States Manganese Co., manganese, $21,157.64, 15 per cent. In the claim of John Crisle, which had been disallowed, an award of $469 was recommended. This was 93 per cent of the amount claimed.

# NEWS BY MINING DISTRICTS

## Special London Letter

### Coal Strike Affecting All Industry—Tin Mines of Cornwall in Bad Straits

London, Oct. 19 — Virtually the sole topic of conversation in all circles is the coal strike, which began on Saturday. The very threat that the miners would "down tools" had an unsettling effect upon industry, and now that the strike is an actual fact works of all descriptions are closing down, throwing thousands of men and women out of employment, holding up shipping and causing the cancellation of orders in all directions. As the miners refuse to increase production, and the profit on export coal about which they are squabbling is rapidly vanishing, the economic position is becoming decidedly serious. One reflex influence of this intolerable attitude is to be seen in the Cornish tin mining industry. Never having been able to lay in stocks of coal owing to lack of financial ability and insufficient transport, the mining companies will shortly be compelled to face the question of ceasing operations. Some of the tin mines are very wet, and in the event of the fuel supplies becoming exhausted, and the workings flooded, the condition of the properties will be parlous. Seeing that they may be prevented from getting production away from the mines, and further that they may have to finance it for a considerable period, the smelters are refusing to purchase. This naturally is a great disadvantage to the companies, especially in view of the persistent fall in the price of the metal.

Not so very long ago tin was selling at £350 a ton; it is now only £238 5s. There seems to be a daily drop, and no means of stopping the dry rot. The explanation partakes of a dual character. Just when it was hoped and believed that the demand for the metal would expand and the price advance, some 2,000 tons were dumped upon the market from the East. This came as a distinct surprise, for the statisticians had previously held the opinion that they knew the exact quantity in port, afloat and abroad. To a certain extent this affected the problem of stabilizing the price, for it was surmised that other secret stores existed. Now that factories and engineering works are fast closing down the demand for tin has fallen away very considerably. In the event of any of the older Cornish mines being abandoned on account of the expense of dewatering, attention will be directed to reopening the silver lead mines which were worked about sixty or seventy years ago in Cornwall and Devon. Although there were about sixty such properties operations were not on a large scale. The idea would be to ascertain whether the lodes persist laterally and in depth, and if so whether the metal content could be profitably extracted in present conditions.

With the public really standing out of the markets, business is at a very low ebb. And yet funds are less scarce, because being unemployed in industry they are available for Stock Exchange purposes, or other financial operations. One or two mining companies are taking advantage of this state of affairs to arrange an issue of capital. Terms suggested are rather high, but as in the ordinary way there would be difficulty in obtaining money, they are cheerfully complied with.

## CANADA

### British-Columbia

### Granby's Option on Ecstall Property Dropped—To Protect Against Worthless Stock

**Anyox**—The Ecstall copper property, for several years bonded by the Granby Con. M. S. & P. Co., which did much drilling and other development, has returned to the original owner, the company's option having been allowed to lapse. The general manager of the company is quoted as saying that the property no doubt would be worked eventually but not for the copper. Sulphur and iron are found in the ore but its copper content is not as high as in the product of the Hidden Creek Mines.

**Victoria**—The protection of the guileless public against the designing salesman of worthless mining stock is the subject of a recent pronouncement by the British Columbia Minister of Mines. He says: "The Minister of Mines has been given wide powers (under the Mineral Survey and Development Act), as any statement in regard to any company made by him is absolutely privileged. This is a policy intended primarily, and, in fact, solely for the protection of the investing public. The Resident Mining Engineers, being in the field and in close touch with actual mining operations and development, are in a position to know whether statements made by stock mining companies for the inducement of the sale of shares are accurate, or if they do not can readily confirm such statements. British Columbia in the past has been afflicted with too many flotations designed to 'mine the public.' The Department of Mines is determined that the issuance of worthless mining stock shall cease. Hence the legislation by which the government mining engineers are charged with the responsibility of assisting the Minister in seeing that the statements made by mining companies in prospectus or any documents issued for stock selling purposes are strictly in accordance with the facts. In the last few years there has been occasion more than once to apply the terms of the act with results of value to the public and the same policy will be continued, it being the intention that all money invested in mining shall be spent in legitimate mining development."

### Ontario

### McKinley Darragh To Shut Down Savage Mine for Winter—La Rose Shaft House Burns

**Cobalt** — The McKinley-Darragh Mines of Cobalt has decided to shut down the Savage mine for the winter on account of the shortage of power and labor. The retreatment of old tailings has also been stopped.

Fire completely destroyed the head frame and shaft house of the main La Rose shaft, which was one of the historical landmarks of the camp. The vein on which the shaft was sunk was the original discovery of the district, and the shaft house was the first one erected in the camp.

Crown Reserve has taken an option on the North Cobalt mine, which it will unwater in order to make an examination.

The Coniagas and the Mining Corporation have stopped the retreating of old tailings for this season, and the Dominion Reduction Co. will stop early in November.

**Kirkland Lake**—The Ontario Kirkland has issued a statement that they expect to have a 100-ton mill in operation by September, 1921. Construction work will not be started until spring.

**Porcupine**—Labor conditions in Porcupine are expected to improve through the importation of men by the Hollinger and Dome from Europe. These two properties are able to absorb about 1,000 men, but it is not expected that they would be able to obtain this number before a considerable time. The men coming from Europe will have a very beneficial effect on the labor situation.

It is understood that 200,000 shares of the Vipond-North Thompson stock is to be taken up at 30c. a share. This money will finance the company and permit of its being reopened.

At the North Davidson annual meeting the president stated that three diamond drill holes gave an average of $25 per ton over very big widths.

### COLUMBIA

**Amalfi**—E. A. Probst, manager of La Viborita Mining Co. in Amalfi, Department of Antioquia, inspected the mine El Comstock Antioqueño early in September. This property is in charge of Gustavo White, of Amalfi, who states that the company is working but one of the three veins on the property and has in sight 1,200,000 tons of $10 ore. There is 1,200 tons on the dumps. A mill is needed with proper financing.

## MEXICO

### New Cyanide Plant Built by Melchor, Ocampo y Anexas—Silver's Decline Gives Concern

**Durango**—The mining agency here has just given out some interesting figures. In 1918, twenty-eight new mining denouncements were made in the state. In 1919, thirty-nine denouncements were made and this year ninety-one denouncements have already been filed, with the probability that the total number will pass the one hundred mark considerably before the end of the year. At the same time over 1,000 pertenencias have been allowed to lapse because the owners refuse to pay back taxes of several years. It is probably the intention in many cases to redenounce many of the properties, in isolated parts, thus escaping the taxes altogether.

Twenty-eight denouncements were recently made in the name of, or by agents of General Francisco Villa. One of these properties, it is reported, is very rich and the General has already refused a large sum offered by American capitalists.

The Melchor Ocampo y Anexas Co. in the Tejamen district has just constructed a new cyanide plant with the capacity of 100 tons daily.

**City of Mexico**—The rapid and continued decline of silver naturally threatens to throw the principal mining industry out of wear. Most of the important companies are holding their bullion, hoping that the fall is purely temporary and the smaller concerns are fighting from hand to mouth buoyed up by the same expectations. Silver cannot be mined profitably in Mexico under 80c. an ounce and if the price of the white metal continues down permanently, or for any great length of time there will, of course, be a general shutting down and a mining panic. The National Chamber of Commerce and Industry has already called upon the secretary of the treasury for relief in the shape of reductions in the mineral export tax and also a lessening of the general mining taxation. The secretary has the matter under examination, but, it is understood, is inclined to believe that the decline is only a flurry and that an advance can be expected at any time. At this date the actual working situation remains about the same. That is, the new work which has been inaugurated has not been suspended, nor is there any indication of any let up in the general output at this time.

## ARIZONA

### Hardshell Company To Resume Development Soon

**Patagonia**—A promising shoot of high-grade sulphide ore has been opened during the last few months in the Hardshell mine above the 325-ft. level. Several carloads have been shipped to the smelter and the returns range from $50 to $75 a ton in silver and lead. Interesting features of this orebody are that it is surrounded by carbonate ore in a leached and oxidized zone not far above present water level, and its lateral and bottom limits have not been determined by existing development. The orebody is being developed and mined by lessees Gardiner & Young, whose lease expires on Dec. 23, 1920, after which date the ground will be operated on company account. The company plans to resume development operations through its 435-ft. shaft in the near future. A crosscut will be driven to cut the Hardshell vein, and a drift will be advanced to connect with the bottom of the old inclined shaft. The company is in the market for fuel oil and equipment to unwater the shaft. The company's Bender properties have been leased and manganese-silver ore is being developed. The Hardshell properties are under the management of Howard K. Welch.

**Tombstone** — The Mellgren Group, consisting of 55 claims in the western part of the district have been purchased by a New York company, of which F. W. Clark is president. Enough work has been done on these claims in the past years to show a large amount of silver ore of milling grade. It is planned to erect a 250-ton mill. This company which is incorporated as the Tombstone Silver Fields, has also taken over the Old Guard mine and the Merrimac group and will start development work at once. All work is under the supervision of Frank Cavanaugh, an engineer of New York.

The Solstice Mining & Milling Co., composed of local business men, have purchased four claims in the State of Maine district, three and one-half miles south of Tombstone. A three-drill I.-R. compressor, a 30-hp. gasoline engine and gasoline hoist are on the ground ready for installation, a two-compartment shaft has been started and will be sunk 500 ft. before drifting is started. The company intends to erect a small mill to concentrate a large amount of 10-oz. silver ore on the dump. W. T. Boyd is president and M. M. Bludworth secretary. Both are Tombstone business men.

Two hundred names were drawn Oct. 27 for jurymen in the famous Bisbee deportation case which is scheduled to start Nov. 8.

## NEW MEXICO

### Hecla Divide Bringing in Machinery at Pinos Altos—Wentworth & Goodrich Add to Fluorspar Holdings

**Lordsburg**—Wentworth & Goodrich, of Battle Creek, Mich., who recently took over the Great Eagle fluorspar property north of Lordsburg, are reported to have taken over a fluorspar prospect in the Franklin Mountains about 25 miles north of El Paso. Development work will be conducted under the general supervision of Alfred Roos, mining engineer.

**Pinos Altos**—The Hecla Divide Mining Co. that recently took over the Langston mine, five miles north of town, have been doing considerable substantial road work preparatory to bringing in machinery and supplies.

## CALIFORNIA

### Yuba Gold Resumes Normal Dredging —Soulsby Mines Co. Incorporated

**Hammonton**—The lifting of power restrictions has permitted the resumption of normal gold-dredging operations on the Yuba River.

**Kennett** — The Mammoth is now working steadily with night and day shifts as a result of the lifting of the power ban.

**Sonora**—Articles of incorporation of the Soulsby Mines Co. have been filed in the county clerk's office in Sonora, which will be the principal place of business. D. Miller and D. Coleman, of San Francisco; W. H. Bourke, of Oakland; J. O. Gillice, of Berkeley, and Eric Sergerstrom, of Sonora, are directors. The capital stock is $500,000 with shares at $1 each, and the company is incorporated under the laws of California. J. O. Gillice, former superintendent, will be in charge.

**Downieville**—L. A. Thatcher, of San Francisco, who has purchased the machinery at the Gold Point mine here, is shipping it to his holdings in other parts of California.

**Grass Valley**—The Idaho-Maryland Co. has a 15-stamp mill ready to operate, although no ore has been taken from the mine and the lower workings are still filled with water. The stamps formerly used at the Union Hill plant have been installed at the Idaho-Maryland. The company has painted all buildings in the group surrounding the shaft a dark green and has improved its office building.

## NEVADA

### Ely District Quiet—Cyanide Mill Planned for Nivloc Mine—Operations at Tonopah

**Silver Peak** — The Nivloc Northern Mines Corp. has completed plans for installing a 100-ton cyanide mill at the Nivloc mine near Silver Peak. The plans call for the extension of the electric power line eight miles to the mill. A large tonnage of ore that is said to run over $10 in silver and gold is blocked out in the mine.

**Winnemucca**—The Silver State Chemical Co. has bought ground on which it plans to erect a plant of 35 tons daily capacity to treat silver-lead-zinc ores.

**Simon**—The U. S. Smelting & Refining Co. is reported to have advanced the funds for the new mill which the Simon Silver-Lead company is erecting, and also to have contracted for both the lead and zinc concentrates to be produced by the mill. Development work at the mine has recently been confined to the 7th level, which is 565 ft. deep.

**Goldfield**—The concrete collar at the shaft of the Goldfield Deep Mines company has been set, a wooden headframe erected and the 75-hp. hoist put in place. This will be used to the 800-ft. point, when an 80-ft. steel headframe and a 250-hp. hoist will be installed, the foundations having been prepared.

**Tonopah**—Recent shipments of bullion indicate a gross production from the mines of the Tonopah district for October of about $500,000. The last shipments reported, which represent the cleanup for the first half of October, were Tonopah Belmont $89,100, West End $46,000, and Tonopah Extension $49,000.

**Divide**—In the Tonopah Divide mine the crosscuts on the 800 and 1,000 levels are being driven ahead rapidly in a southeasterly direction. Developments on the upper levels have proven the ore shoot to have a rake to the southeast so these crosscuts are being driven toward the projected position of the ore shoot and not to cut the vein at the nearest point. Regular development work was performed on the upper levels with no important changes reported.

Important work for the entire western portion of the Divide district is being done through the Kernick Divide shaft from the 900 level. Financial aid has been arranged with the Revert Divide, Western Divide, Annex Divide and Hasbrouck sufficient to perform at least 3,000 ft. of crosscutting.

Active work is being prosecuted at the Alto, Hercules, Silver and many other properties throughout the Divide district.

**Ely**—The Ely district is quiet, only a small tonnage of copper ore being handled at the Nevada Consolidated mill at McGill, which is running at half capacity. The rich copper ore opened up recently at the Ruth mine has added new interest to the area adjacent to the strike and among other companies that plan to do increased work is Ely Calumet company, controlled by Al. D. Myers.

The lead mines at Ward, near Ely, will discontinue shipping to the Salt Lake Valley smelters pending adjustment of the freight rates which having been increased twice during the last three years are now prohibitive. A small force of men will be retained on development.

The milling plant at Taylor is now running exclusively on dump ores from the mines, the principal value being silver with some gold.

**Pioche** — Ore shipments from the Pioche district for the week ended Oct. 21 totaled 2,710 tons and came from the following shippers: Prince Consolidated, 1,925 tons; Virginia Louise, 505 tons; Combined Metals, 150 tons; Bristol Silver Mines, 90 tons; and Columbia Trust Co., 40 tons.

## COLORADO

### Vanadium Strike Near Telluride—Thermit Corp. Buys Vanadium—Uranium Property

**Denver**—The demand for zinc oxide has fallen off, and the zinc oxide plants at Leadville and Canon City are experiencing some difficulty in marketing their product. The light demand is chiefly due to the fact that it is used in the manufacture of automobile tires, which in turn are in poor demand on account of the falling off in the automobile business. Thus the slackening up of automobile manufacture has indirectly affected the price of zinc ores. Unless the price of zinc advances in the near future many of the small zinc ore producers in the Western states may have to discontinue operations, especially in view of the increase in freight rates. In the Leadville and Aspen districts the freight rates have not been advanced, and the zinc ores will move as formerly to the Leadville and Canon City oxide plants provided these plants can market their product.

**Telluride**—The discovery of vanadium-bearing rock in the white cliffs about one-half mile north of the city has created some local excitement and several new claims are being located. The Colorado Vanadium Corporation is interested in several of the new claims.

**Mesa County**—The Kunkle group of vanadium and uranium claims, at the head of Kirks Canon, in the Gateway district, has recently been sold to the Thermit Corporation, of New York, which will operate the properties for the vanadium ore, which is the principal product of the deposits.

## UTAH

### Increased Power Rates Expected To Work Hardship—Iowa Copper Elects

**Salt Lake City**—It is feared that the increased power rates stipulated by the Utah Public Utilities Commission for all users of power supplied by the Utah Power & Light Co., even for those holding especial contracts entered into some time ago, in fact before the creation of the commission as a body, will work hardship to the mining industry, already struggling under adverse conditions. In this regard, the Judge Mining & Smelting Co. on Oct. 23, the date on which the new rates became effective, closed its electrolytic zinc plant, giving as reason the low price of zinc and increased mining and refining costs. As already stated in these columns, the interests affected by the new ruling of the commission are planning to bring the question before the courts for adjudication.

**Park City**—Iowa Coper held its annual meeting Oct. 19, electing L. R. Perry president; D. G. Scott vice-president and manager; R. T. Kimball, secretary and treasurer; D. L. King and John Carson additional directors.

## MONTANA

### The Philipsburg Manganese Co. Shuts Down—Flohart Silver Resumes

**Butte**—Barnes King's North Mocassin mine will be closed so far as company operations are concerned because of a dwindling ore supply of the grade sufficient to afford a profit with gold mining costs at their present high level The mine will be turned over to lessees. This is the second property to be closed by the Barnes-King, the Piegan-Gloster having suspended about sixty days ago.

**Philipsburg**—Mines of the Philipsburg Manganese Co. have been closed, rendering about 500 men idle. According to officials the suspension is only temporary. The Philipsburg company chiefly has been producing manganese ore, with some silver, the former ore being shipped to Pacific Coast concerns, principally for battery use.

**Neihart District**—Mining operations have been resumed by the Flohart Silver Mines. Ore bins are being prepared for storing second-class milling ore. Ore is being mined in No. 1 tunnel and a shipment will be made soon.

## MINNESOTA

### Cuyuna Range

### Feigh Suspends Shipping for Season—Shipment From Ironton Mine Also Stopped Temporarily

**Ironton**—Owing to inability to secure railroad cars the Cuyuna-Duluth Iron Co. has been forced to suspend shipments from its Ironton mine temporarily. The ore hoisted is being stocked and the operators expect to load it out before close of navigation. Shipments are behind schedule.

The Feigh mine, operated by M. A. Hanna & Co., has shipped 32,000 tons from stockpile and suspended shipping for the season. The underground force has been laid off temporarily to allow moving the boilers and hoisting equipment to new quarters in a concrete engine and boiler house which is now nearly completed. The property will probably be unable to resume mining operations for several weeks. The Feigh has over 50,000 tons of ore still in stock, which will hold over to next season.

## MICHIGAN

### Seneca Shaft Concreted to 5th Level

**Calumet**—Concreting of the shaft of the Seneca Mining Co. is completed to the bottom of 5th level. The crosscut will be driven to the vein and drifting started as soon as the forms can be removed within a week or ten days.

The 4th level south drift has reached the boundary and the north drift is 725 ft. from the shaft. The management continues to ship small quantities of rock (ore) to the Baltic stamp mill. At the Gratiot shaft of the Seneca drifting continues on the 13th level and the south drift will reach the limit of the property or Mohawk Mining Company's boundary in about two weeks. The 5th level crosscut has just cut the lode.

### Menominee Range

**Iron Mountain**—The Oliver Iron Mining Co. has found it necessary to start up its auxiliary steam plants at the Aragon and Chapin mines, the water supply in the Menominee River being insufficient to develop enough current to keep the company's mines in operation. There are steam turbines at both the Aragon and the Chapin. Many of the other mining companies in the Michigan field are experiencing the same troubles, the streams and lakes being lower now than for many years.

# THE MARKET REPORT

## Daily Prices of Metals

| Oct. | Copper, N. Y. net refinery* | Tin | | Lead | | Zinc |
|---|---|---|---|---|---|---|
| | Electrolytic | 99 Per Cent | Straits | N. Y. | St. L. | St. L. |
| 28 | 14.85 | 39.50 | 40.00@40.50 | 6.75@7.00 | 6.60@6.85 | 6.90 |
| 29 | 14.85 | 39.25 | 40.25@40.75 | 6.75@7.00 | 6.60@6.85 | 6.85@6.90 |
| 30 | 14.85 | 39.25 | 40.25@40.50 | 6.75@7.00 | 6.60@6.85 | 6.85 |
| Nov. 1 | 14.75@14.85 | 39.00 | 39.75@40.00 | 6.75@7.00 | 6.55@6.80 | 6.85 |
| 2 | ..... | .... | ..... | ..... | ..... | .... |
| 3 | 14.60@14.85 | 38.50 | 39.25@39.75 | 6.75@7.00 | 6.55@6.80 | 6.80@6.85 |

*These prices correspond to the following quotations for copper, "delivered": 15.00, 15.00, 15.00, 14.90@15.00 and 14.75@15.00c.

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for deliveries constituting the major markets, reduced to the basis of New York, cash, except where St. Louis is the normal basing point, or as otherwise noted. All prices are in cents per pound. Copper is commonly sold "delivered," which means that the seller pays the freight from the refinery to the buyer's destination.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. Tin is quoted on the basis of spot American tin, 99 per cent grade, and spot Straits tin.

## London

| Oct. | Copper | | | Tin | | Lead | | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| | Standard | | Electrolytic | | | | | | |
| | Spot | 3 M | | Spot | 3 M | Spot | 3 M | Spot | 3 M |
| 28 | 89 | 88½ | 97 | 265½ | 267 | 36¼ | 35¾ | 38¾ | 39½ |
| 29 | 89 | 88½ | 97 | 267¼ | 269½ | 36¼ | 35¾ | 39 | 39¼ |
| 30 | .... | .... | ... | .... | .... | ... | ... | ... | .. |
| Nov. 1 | 91 | 89½ | 96 | 266½ | 267 | 35⅞ | 35½ | 38 | 39⅜ |
| 2 | 91½ | 90¼ | 96 | 264¾ | 266½ | 35⅝ | 35⅜ | 37⅞ | 39¼ |
| 3 | 91½ | 91 | 97 | 262 | 264¾ | 35¾ | 35¼ | 37¾ | 39¼ |

The above table gives the closing quotations on the London Metal Exchange. All prices in pounds sterling per ton of 2,240 lb.

## Silver and Sterling Exchange

| Oct. | Sterling Exchange | Silver | | | Nov | Sterling Exchange | Silver | | |
|---|---|---|---|---|---|---|---|---|---|
| | | New York, Domestic Origin | New York, Foreign Origin | London | | | New York, Domestic Origin | New York, Foreign Origin | London |
| 28 | 346 | 99½ | 79⅞ | 52 | 1 | 343 | 99½ | 80¾ | 52⅞ |
| 29 | 345½ | 99½ | 80½ | 52⅜ | 2 | ... | ... | ... | 52⅝ |
| 30 | 343 | 99½ | 80 | 52½ | 3 | 343½ | 99½ | 82⅛ | 53¾ |

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

## Metal Markets

### New York, Nov. 3, 1920

The feeling in the market has been better during the last week, with the increased stability of prices. Copper, tin, and zinc are relatively so cheap that further declines are not expected, and lead seems to be firm at present prices, even with a weak demand. The chief interest during the week, of course, centered in the election. The result, however, being almost exactly as expected, is hardly likely to cause market changes of importance. The unanimity of opinion, as expressed by the voters, that the Republican party should now assume control, is considered a better omen for settled conditions than if the election had been close.

### Copper

There is no doubt that 15c. copper has stimulated buying, and we are reliably informed that large tonnages have been marketed at current levels. Some of the reports, however, are exaggerated. Demand for modest quantities has been rather widespread, and producers generally consider that business has been fairly satisfactory. Metal for delivery early in the year, principally January and February, is desired by most inquirers, and some outside agencies are reported to have cut under the 15c. price slightly on prompt deliveries. A report is also current that some sales of forward metal were made today at 14¾c., delivered, to tempt the largest possible amount of buying. No general tendency further downward has yet manifested itself, however, and the feeling among both buyers and sellers is that no mistake will be made in contracting for the next few months' supplies at present prices.

An interesting feature of the copper market is the auction sales which have taken place on the Metal Exchange during the last month. These sales have in general been made by agencies whose sales contracts for metal at high prices have been cancelled. They resort to an auction sale to establish their actual loss, with the idea of later carrying the matter to the courts. In some instances also the seller has been the buyer.

### Lead

No change has been made in the A. S. & R. official New York price of 7¼c. for metal sold on contract. This continues to be above the market, which is dull but steady, at practically the same prices which obtained for last week. German and French lead continues to come in, but is not a factor in the market, for it was sold into consuming hands some time ago. The weak demand is a result of reduced current requirements on the part of consumers, and the lack of ability to finance stocks for future use, rather than to a feeling that the price is likely to fall.

Chemical lead of good quality continues at a premium of about ⅛c. over the price asked for the desilverized product. Few inquiries are reported, however.

The London price has receded gradually during the week, but remains above New York parity.

### Zinc

The zinc market continues featureless. The tendency continues downward, but only a slight total loss for the week is noted. Sales have been small and many producers continue out of the

**Monthly Average Prices for October**

| | |
|---|---|
| **Copper:** | |
| New York Electrolytic .... | 15.934 |
| London Standard ..... | 93.327 |
| London Electrolytic ..... | 104.905 |
| **Lead:** | |
| New York ..... | 7.070 |
| St. Louis ..... | 7.018 |
| London ..... | 35.238 |
| **Silver:** | |
| New York, foreign ..... | 83.480 |
| New York, domestic ..... | 99.500 |
| London ..... | 54.197 |
| Sterling Exchange ..... | 346.460 |
| **Zinc:** | |
| St. Louis ..... | 7.150 |
| London ..... | 39.756 |
| **Tin:** | |
| 99 per cent ..... | 39.310 |
| Straits ..... | 40.555 |
| London ..... | 258.190 |
| **Antimony** ..... | 6.723 |
| **Quicksilver** ..... | 67.200 |

market at current levels. Production promises to decrease, and the Republican victory, with the accompanying possibility of a tariff increase, should tend to arrest further recession.

### Tin

The consuming demand has improved slightly, but the traders still are the major factor in a narrow market. Metal for forward delivery is selling at such a premium that if the necessary financial arrangements can be made it will pay one to buy spot metal and assume the carrying charges.

Straits tin for future delivery: Oct. 28th, 42@42.75c.; 29th, 42@42.50c.; 30th, 41.75@42c.; Nov. 1st, 41.75@42c.; 3d, 41.25@41.75c.

Arrivals of tin in long tons: Oct. 27th, London, 50; 29th, Straits, 925; China, 175. Total for October, 2,900.

### Silver

Since our last report the silver market has remained fairly steady until today, when a sharp advance to 53⅜d. occurred in London, with a consequent rise in the New York rate. Buying on the part of Indian bazaars is reported as responsible for the improvement. Fundamental conditions remain unchanged, with China the only possible substantial buyer, although Indian exchanges will have an effect upon the course of the market.

**Mexican Dollars**—Oct. 28th, 60½; 29th, 60⅞; 30th, 60⅞; Nov. 1st, 61¼; 3d, 62½.

### Gold

Gold in London: Oct. 28th, 117s. 11d.; 29th, 118s. 1d.; Nov. 1st, 119s. 2d.; 2d, 119s. 2d.; 3d, 119s. 2d.

### Foreign Exchange

The European exchange market was dull during the last week. Italian exchange reached the lowest figure it has ever known. German marks continue to recede, as is to be expected. Today, francs are quoted at 6.25c; lire, 3.62c.; and marks, 1.26c. New York funds in Montreal, 9¾ per cent premium.

### Other Metals

**Aluminum**—For 50-ton lots: ingot, 99 per cent and purer, 33.1c.; 98@99 per cent, 32.90c.

**Antimony**—Chinese and Japanese brands, 6⅞@6¾c.; W. C. C. brand, 8c. per lb. Cookson's "C" grade, 12½@13c. Chinese needle antimony, lump, nominal at 6@6½c. per lb. Standard powdered needle antimony[1] (200 mesh), 9c. per lb. Market dull.

White antimony oxide, Chinese, guaranteed 99 per cent $Sb_2O_3$, wholesale lots, 9½c.

**Bismuth**—$2.55 per lb., 500-lb. lots, and $2.57 per lb., 100-lb. lots.

**Cadmium**—Nominal, $1.40@$1.50 per lb. Market steady.

**Cobalt**—Metal, $6 per lb.; black oxide, $4.10 per lb.; sulphate, $1.60.

**Iridium**—Nominal, $400@$450 per oz.

**Magnesium**—Crude, 99 per cent or over pure, $1.75 per lb. for 100 lb. lots and over, f.o.b. Niagara Falls.

[1]**Molybdenum Metal** in rod or wire form, 99.9 per cent pure, $32@$40 per lb., according to gage.

**Nickel**—Ingot, 43c.; shot, 43c.; electrolytic, 45c., f.o.b. Bayonne, N. J.

**Monel Metal**—Shot, 35c.; blocks, 35c., and ingots, 38c. per lb., f.o.b. Bayonne.

**Osmium**—Open market, $50@$75 per troy oz.

**Palladium**—$85 per oz. Dull.

**Platinum**—Firm at $95@$100 per oz.

**Quicksilver**—Market quiet; $60 per 75-lb. flask. San Francisco wires $60@$62.50. Market steady.

**Ruthenium**—$200@$220 per troy oz.

[1]**Selenium**—Black powdered, amorphous, 99.5 per cent pure, $2@$2.25 per lb. Demand strong.

[1]**Thallium Metal**—Ingot, 99 per cent pure, $20 per lb.

[1]**Tungsten Metal**—$35@$60 per kilogram, according to purity and gage.

### Metallic Ores

**Chrome Ore**—Guaranteed 50 per cent $Cr_2O_3$ foreign ore with a maximum of 6 per cent silica, 75@85c. per unit, New York. California concentrates, 50 per cent $Cr_2O_3$ and upward, 70@75c.

**Manganese Ore**[1]—60@70c. per unit, seaport; chemical ore ($MnO_2$) $70@$80 per gross ton, lump; $80@$90 per net ton, powdered.

**Molybdenum Ore**—85 per cent $MoS_2$, 65@70c. per lb. of contained sulphide, New York.

[1]**Tantalum Ore**—Guaranteed minimum 60 per cent tantalic acid, 55@65c. per lb. in ton lots.

[1]**Titanium Ores**—Ilmenite, 52 per cent $TiO_2$, 1¼@2c. per lb. for ore. Rutile, 95 per cent $TiO_2$, 15c. per lb. for ore, with concessions on large lots or running contracts.

**Tungsten Ore**—Scheelite, 60 per cent $WO_3$ and over, per unit of $WO_3$, $6 f.o.b. mines; wolframite, 60 per cent $WO_3$ and over, per unit of $WO_3$, $5@$5.50, in New York.

**Uranium Ore (Carnotite)**—$2.75@$3 per lb. for 96 per cent of the contained oxide ($U_3O_8$). Ores must contain a minimum of 2 per cent $U_3O_8$.

**Vanadium Ore**—$2 per lb. of $V_2O_5$ (guaranteed minimum of 11 per cent $V_2O_5$), New York.

[1]**Zircon**—Washed, iron free, 5c. per lb.

[1]**Zirkite**—According to conditions, $80@$90 per ton, carload lots. Pure white oxide, 99 per cent, is quoted at $1.15 per lb. in ton lots.

### Zinc and Lead Ore Markets

**Joplin, Mo., Oct. 30**—Zinc blende per ton, high $48.10; basis 60 per cent zinc, premium, $41; Prime Western, $40; fines and slimes, $37.50@$35; calamine, basis 40 per cent zinc, $35. Average settling prices: Blende, $44.30; calamine, $38.34; all zinc ores, $44.14.

Lead, high, $104.85; basis 80 per cent lead, $65; average settling prices, all grades of lead, $82.47 per ton.

Settlements were made for zinc as high as $45 basis and for lead $100 basis.

Shipments for the week: Blende, 10,462; calamine, 286; lead, 1,708 tons. Value, all ores the week, $572,900.

Shipments for ten months: Blende, 491,363; calamine, 8,836; lead, 76,858 tons. Value, all ores ten months, $31,795,670.

All the mines in the closing movement held the full two weeks, with a number that will remain closed until after the election. It is estimated the two restriction movements this year reduced the production around 36,000 tons. There is rumor of another closing movement of one or two weeks at the year-end. The shipment this year already exceeds last year over 89,000 tons of zinc and 15,000 tons of lead.

**Platteville, Wis., Oct. 30**—Blende, basis 60 per cent zinc, $45 base for high grade. Lead ore, no sales reported. Shipments for the week: Blende, 1,175; calamine, 30; lead, 30 tons. Shipments for the year: Blende, 57,071; calamine, 2,504; lead, 4,428; sulphur ore, 1,342 tons. Shipped during the week to separating plants, 2,019 tons blende.

### Non-Metallic Minerals

**Asbestos**—Crude, No. 1, $2,000@$3,000; No. 2, $1,400@$1,700; spinning fibres, $400@$800; magnesia and compressed sheet fibres, $325@$400; shingle stock, $110@$150; paper stock, $60@$75; cement stock, $17.50@$30; floats, $8.50@$15, all per short ton, f.o.b. Thetford, Broughton, and Black Lake mines, Quebec, Canada; 5 per cent to be added as Canadian royalty export sales tax.

**Barytes**—Crude, 88 to 94 per cent barium content, $10@$12 per net ton; ground (white) $24@$30 in bags, carload lots; (off-color) $22@$26 in bags, carload lots; all f.o.b. Kings Creek, S. C. Crude, 88 to 94 per cent, $23; ground (white), $45; ground (off color) $30@$32 per net ton, less than carload lots, f.o.b. New York. Crude, first grade, $10 per ton, f.o.b. cars, Missouri; floated, $28 per ton in bbls.; $26.50 per ton in 100-lb. bags; extra charge for bags, f.o.b. St. Louis.

**Chalk**—English, extra light, 5@7c.; light, 5@6c.; dense, 4½@5c. per lb., all f.o.b. New York.

**China Clay (Kaolin)**—Crude, $9@$12; washed, $12@$15; powdered, $18@$22; bags extra, per net ton, f.o.b. mines, Georgia; crude, $8@$12; ground, $15@$40, f.o.b. Virginia points. Domestic lump, $10@$20; powdered. $25@$30; imported lump, $25@$35; powdered, $30@$60, f.o.b. New York.

**Feldspar**—Crude, $8@$14 per gross ton, f.o.b. Maryland and North Carolina points; $7.50@$10, f.o.b. Maine; ground, $27@$30, car lots, f.o.b. Baltimore; ground, $17@$21, f.o.b. North Carolina points; $17@$21 per ton, No. 1 ground, f.o.b. New York State; $21@$23 per ton, ground, f.o.b. Maine. Crude spar very scarce.

**Fluorspar**—Gravel, guaranteed 85 per cent calcium fluoride and not over 6 per cent silica, $25 per ton, f.o.b Illinois mines, and $27.50, f.o.b. Kentucky; ground, suitable for acid, chem-

[1]Furnished by Foote Mineral Co., Philadelphia, Pa

ical or enameling purposes, $60; lump, $17.50, f.o.b. Tonuco, N. M. In Canada 85 per cent calcium fluoride sells for $20 per ton f.o.b. Madoc; output limited. Canadian price generally $18 (Canadian currency) per ton, f.o.b. mines; market inactive.

**Graphite**—The 90 per cent crucible grade is held in Alabama for 9c. per lb. and 85 per cent grade is practically unobtainable, prices being 7@9c. The higher lubricating grades sell for 11@40c., according to carbon content.

**Gravel**—No analysis guarantee, f.o.b. Roseview, Ill., $25 per ton; gravel suitable for acid, chemical or enameling purposes, $60.

**Gypsum**—Plaster of Paris in carload lots sells for $4.25 per 250-lb. bbl., alongside dock, New York. Raw crushed rock, $3.50@$4.50; calcined stucco, $9; f.o.b. works, Illinois.

**Kaolin**—See China Clay.

**Limestone**—Dolomite, 1@2 man size, $1.60@$1.65; 2@8 in., $1.55@$1.65 per net ton, f.o.b. Plymouth Meeting, Pa.; fluxing, $1.65@$1.75 per net ton, f.o.b. Howellville, Pa.

**Magnesite**, Calcined — High-grade caustic calcined, lump form, $35@$40 per ton, carload lots, f.o.b. California points. In Chicago district, $57.70; Atlantic seaboard, $61@$63.

Dead-Burned — $32.50 per net ton, Chewelah, Wash.; $52@$58, Chester, Pa. Austrian grade, $52@$55 per ton, f.o.b. Baltimore. (Magnesite brick—See Refractories.)

**Mica**—India block mica slightly stained, per lb.: No. 6, 50c.; No. 5, $1.20 @$1.40; No. 4, $2@$3; No. 3, $4.25@ $5; No. 2, $5.50@$7; No. 1, $8. Clear block: No. 6, 55c.; No. 5, $2; No. 4, $3.50; No. 3, $5, No. 2, $6.50; No. 1, $8; A1, $10; extra large, $25, all f.o.b. New York; ground, $150 per ton, Philadelphia. Domestic, uncut, f.o.b. Franklin, N. C., as follows: Scrap, $45 @$50 per ton; punch, 10c. per lb.; circle, 15@25c.; 1½ x 2 in., 75c.; 2 x 2 in., $1.15; 2 x 3 in., $1.65; 3 x 3 in., $2.10; 3 x 4 in., $2.50; 3 x 5 in., $2.75; 3 x 6 in., $3.75; ground 165 mesh, $240 per ton; ground roofing mica, $60; mica washers, 75c.@$2 per lb.; 1¼-in. disks, No. 1, $1.60 per lb.; No. 2, $1.30. The foregoing domestic prices obtain also in the Chicago district.

[1]**Monazite** — Minimum of 6 per cent thorium oxide, $35 per unit, duty paid.

**Phosphate Rock**—Per long ton, Florida ports: 77 per cent tricalcium phosphate, $13; 75 per cent, $11.50; 75@74 per cent, $11; 70 per cent, $8.35; 68 per cent, $7.85; 68@66 per cent, $7.60. Finely ground Tennessee rock sells for $8.50 per net ton for 13 per cent phosphorus content, agricultural application; for acid-making, 14 per cent, $9; both prices f.o.b. Centerville, Tenn.

**Pumice Stone**—Imported, lump, 4@ 50c. per lb.; domestic lump, 6c.; ground, 4@7c., all f.o.b. New York.

**Pyrites**—Spanish fines, per unit, 12c., c.i.f. Atlantic seaport; furnace size, 17c.; Spanish lump, 14@16c.; domestic fines, f.o.b. mines, Georgia, 12@14c. Market improving.

**Quartz**—(Acid tower) fist to head, $10; 1¼ to 2 in., $14; rice, $17, all net ton, f.o.b. Baltimore; lump, carload lots, $5@$7.50 net ton, f.o.b. North Carolina mines.

**Sand (Glass)**—Dry glass sand, $4 per net ton, f.o.b. cars Mapleton, Pa. Sand, f.o.b. Ottawa, Ill., is $3 per ton; $2.50 on annual contracts. Sand at Klondike. Gray Summit and Pacific, all in Missouri, is $2.50 on contract; some outside sales have been made at $4. St. Louis, open market, at $3.50; contract price on large quantities, $2.50; on small quantities, $3.

**Sulphur**—$18 per ton for domestic; $18@$20 for export, f.o.b. Texas and Louisiana mines. Market quiet.

**Talc** — Paper making, $12@$22 per ton; roofing grades, $9.50@$15; rubber grades, $12@$18, all f.o.b. Vermont. California talc, $20@$45, talcum powder grade. Southern talc, powdered, carload lots, $12@$15 per ton; less than carload, $25, f.o.b. cars; freight to New York $5.25 per ton, carload lots; less than carload lots, $9.25. Imported, $60 @$70; Canadian, $20@$40 per ton.

## Mineral Products

**Arsenic**—White arsenic, 13@14c. per lb.; sulphide, powdered, 16@18c. per lb.,

**Nitrate**—Soda, $3.25 per cwt., ex vessel, Atlantic ports. Market quiet.

**Potassium Sulphate**—Domestic, $225 @$250 per net ton, basis 90 per cent, f.o.b. New York.

## Ferro Alloys

**Ferrocarbontitanium**—For 15 to 18 per cent material, $200@$250 per ton, f.o.b. Niagara Falls, N. Y.

**Ferrocerium**—Per lb., $12@$15. Foreign conditions as affecting the price of American goods remain unchanged.

**Ferrochrome**—Carload lots, spot and contract, 60 to 70 per cent chromium, 6 to 8 per cent carbon, 18½@19c. per lb. of chromium contained; 4 to 6 per cent carbon, 19@20c., f.o.b. works.

**Ferromanganese**—Domestic 76 to 80 per cent, $170@$175, freight allowed; $170, f.o.b. seaboard bases; English, $165, c.i.f. Atlantic seaports. Spiegeleisen, 18@22 per cent, $75@$80, f.o.b. furnace.

**Ferromolybdenum**[1]—Standard grades, carrying from 50 to 60 per cent molybdenum metal, with low sulphur, phosphorus, and arsenic, $2.25@$2.50 per lb. of contained metal, f.o.b. works.

**Ferrosilicon**—For 10 to 15 per cent, per gross ton, f.o.b. works, $60@$65; 50 per cent, $76@$80; 75 per cent $150@$160.

**Ferrotungsten**[1]—Domestic, 70 to 80 per cent W, 75@90c. per lb. of contained tungsten, f.o.b. works. Foreign, 70c.

**Ferro-uranium**—35 to 50 per cent U, $7 per lb. of U contained, f.o.b. works.

**Ferrovanadium**[1]—Basis 30 to 40 per cent, $6.50@$8 per lb. of V contained, f.o.b. works.

## Metal Products

**Copper Sheets** — Current New York price, 25½c. per lb.; wire, 19c.

[1]Furnished by Foote Mineral Co., Philadelphia, Pa.

**Lead Sheets**—Full lead sheets, 10¼c.; cut lead sheets, 10¾c. in quantity, mill lots.

**Nickel Silver**—Unchanged at 36½c. per lb. for 18 per cent nickel.

**Yellow Metal** — Dimension sheets, 23¼c.; sheathing, 23¼c.; rods, ⅝ to 3 in., 20¼c.

**Zinc Sheets**—$12.50 per 100 lb., less 8 per cent on carload lots, f.o.b. smelter; zinc plates, 12c. per lb.

## Refractories

**Bauxite Brick**—56 per cent alumina, $160 per 1,000, f.o.b. Pittsburgh.

**Chrome Cement**—40@45 per cent $Cr_2O_3$, $55@$60 per net ton, and $65 in sacks, carload lots, f.o.b. eastern shipping points.

**Fire Brick**—First quality, 9-in. shapes, $55@$60 per 1,000, Pennsylvania, Ohio and Kentucky. Second quality, $45@ $50.

**Magnesite Brick** — 9-in. straights, $110 per net ton; 9-in. arches, wedges and keys, $121; soaps and splits, $134.

**Silica Brick**—9-in., per 1,000: Chicago district, $65@$70; Birmingham, Ala., $56@$61; Mount Union, Pa., $55 @$60.

## Iron Trade Review

**Pittsburgh, Nov. 2, 1920**

The volume of business in steel products obtainable, even by cutting prices, continues limited. The Steel Corporation continues to operate as fully as physical conditions permit, the corporation being still short of coke at some points. Steel production on the whole is at fully 10 per cent less rate than in August or September.

The 2.35c. price on merchant bars, made recently by one independent, has been withdrawn, and quotations usually do not run below 3c. Plates continue to sag, and the common quotation of 3c. is shaded on particularly desirable business. Black sheets are down to a range of 6.25c. to 6.50c.

The American Sheet & Tin Plate Co. will probably not open its order books for the first half of next year until December, as it will carry over about three months of rolling. Its prices will probably be Industrial Board prices, as heretofore.

**Pig Iron**—Bessemer has been offered at $45, Valley, $2 under the former quotation. Foundry remains at $45 and basic at $40, Valley. Further declines are expected as inquiries develop, predictions being that the market will eventually find a stable level at between $30 and $35.

**Semi-finished Steel**—Prices remain nominal at $55@$60 for billets and $65 for sheet bars. Steel Corporation prices, as recently advanced $5, are $43.50 for billets and $47 for sheet bars.

## Charcoal and Coke

**Charcoal**—Willow, 7c. per lb. in bbls.; hardwood, 6c. per lb., in 250-lb. bbls.

**Connellsville** — Furnace, $16.50@$17; foundry, $18.

# COMPANY REPORTS

## Oriental Consolidated Mining Co. Shows a Small Profit

**Gold: Korea**

The result of the operations of the Oriental Consolidated Mining Co., an American enterprise operating in Korea, for the year ending June 30, 1920, is summarized in the following table.

The tonnage and value of the ore milled were lower than during the previous year (250,868 tons, of a value of $1,464,830.70 was produced in 1918-1919) whereas operating costs were increased, so that net profit compares unfavorably with that of last year. Owing to a drought in Northern Korea during the summer and fall of 1919 and the spring of 1920, a heavy advance in the cost of foodstuffs, wages, and transportation occurred, and the use of hydro-electric power was curtailed, and steam used instead, adding further to the high expense of operating.

A salient feature of the operations was the inability of the company to take advantage of the high premium on gold in China, because the Japanese government prohibits the export of gold.

The production of the active mines which furnished ore for the mills during the year was as follows:

| Name of Mine | Tonnage | Total Value of Ore | Value per Ton |
|---|---|---|---|
| Tabowie | 128,405 | $822,139.40 | $6.40 |
| Taracol | 97,647 | 460,990.93 | 4.72 |
| Chintui | 4,811 | 23,012.66 | 4.78 |
| Tongkol | 2,460 | 50,893.48 | 20.69 |
| Total | 233,323 | $1,357,036.47 | $5.82 |

A total of 25,541 feet of development work was performed. Profit and loss account for the year ending June 30, 1920, follows:

DEBIT

| | Cost per Ton | |
|---|---|---|
| To mining costs | $2.10 | $490,002.08 |
| Milling costs | .66 | 154,442.74 |
| Concentrates expenses | .25 | 58,801.34½ |
| Transportation of ore | .01 | 1,660.19½ |
| General expenses | .65 | 152,060.64½ |
| Total operating and general expenses | $3.67 | $856,967.00½ |
| Depreciation | 1.07 | 250,000.00 |
| Depletion 5 per cent of output | .24 | 56,610.08 |
| Total debits | $4.98 | $1,163,577.08½ |
| Profits for year to balance sheet | .11 | 25,052.30½ |
| | $5.09 | $1,188,629 39 |

CREDIT

| | Cost per Ton | |
|---|---|---|
| By bullion from mills | $2.44 | $569,198.68 |
| Concentrates | 2.41 | 563,002.96 |
| Store profit | .... | 962.16 |
| Interest and other receipts | .24 | 55,465.59 |
| | $5.09 | $1,188,629.39 |

The profit for the fiscal year amounted to $25,052.30½ after deducting depreciation and depletion charges. Dividends were paid during the year in July, 1919 ($107,347.50), and March, 1920 ($214,695), out of an accumulated profit to June 30, 1920, of $859,001.80. A United States income tax of $16,266.03 was also paid. Surplus profit on June 30, 1920, amounted to $520,693.27.

The company has $4,293,900 in capital stock outstanding, of a par value of $10 for each share.

OPERATING RESULTS OF THE ORIENTAL CONSOLIDATED MINING CO.

| | | 1919–1920 | 1918–1919 |
|---|---|---|---|
| Total receipts for the year were | | $1,188,629.39 or $5.09 per ton | $1,282,085.80½ or $5.11 per ton |
| Total operating costs for the year were | | 856,967.00½ or 3.67 per ton | 842,978.38½ or 3.36 per ton |
| Total operating profits before reserves | | $331,662.38½ or $1.42 per ton | $439,107.42 or $1.75 per ton |
| Reserves for depreciation | $250,000.00 | | |
| Depletion | 56,610.08 | 306,610.08 or 1.31 per ton | 310,266.51 or 1.24 per ton |
| Net profits after deductions for reserves | | $25,052.30½ or $0.11 per ton | $128,840.91 or $0.51 per ton |

## Broken Hill South, Ltd., Reports No Production During 1919

**Zinc, Lead: New South Wales**

Productive operations of the Broken Hill South, Ltd., were entirely suspended during the fiscal year ending June 30, 1920, according to a statement of the company, due to the continued strike of underground employees and the destruction by incendiarism of a large portion of the plant. The company is interested in the operations of the Electrolytic Zinc Co. of Australasia Proprietary, Ltd., to the extent of 120,000 fully paid £1 shares. It is estimated in the report that by the end of September, 1920, the output of refined zinc of this company will be raised from 15 to 25 tons per day. Additional units under consideration assure a further increase to 50 and 100 tons per day.

British Australian Lead Manufacturers' Proprietary, Ltd., is another company in the operations of which Broken Hill South is interested. The company has been established for the purpose of manufacturing white lead, paints, and lead products.

## October Mining Dividends

The following is a partial list of dividends paid by mining companies during October, 1920:

| U.S. Mining and Metallurgical Companies | Situation | Per Share | Totals |
|---|---|---|---|
| Am. Smelt. Sec., pf. A | U. S. | $1.50 Q | $255,000 |
| Am. Smelt. Sec., pf. B | U. S. | 1.25 Q | 39,855 |
| Caledonia Mining Co., ls | Idaho | .01 Q | 26,050 |
| Daly-West Mining | Utah | 0.25 Q | 62,500 |
| Electric Point, l | Wash. | 0.15 Q | 119,062 |
| Eagle-Picher Lead | Okla.—Mo. | 1.50 Q | 15,000 |
| Inspiration Consolidated, c | Ariz. | 1.00 Q | 1,181,967 |
| Phelps Dodge | U. S. | 2.50 Q | 1,125,000 |
| Portland Gold Mining | Col. | 0.015 Q | 45,000 |
| Tonopah-Belmont, s. g | Nev. | 0.05 Q | 75,000 |
| Tonopah Extension, g. s | Nev. | 0.05 Q | 64,140 |
| Tonopah Mining, g. s | Nev. | 0.05 Q | 50,000 |
| United Eastern Mining, g | Ariz. | 0.15 | 204,455 |
| U. S. Smelting, Refining and Min | U. S.—Mex. | 1.50 Q | 526,673 |
| U. S. Smelting, Refining & Min., pfd | U. S.—Mex. | 0.875 Q | 425,555 |
| Vanadium Corporation Amer | Col.—Peru | 1.50 Q | 560,001 |
| **Canadian, Mexican, Central and South American Companies** | | | |
| Alvarado Mining & Mill, g. s | Mexico | $0.50 Q | $17,500.00 |
| Asbestos Corp., Can., Ltd | Can. | 1.50 Q | 45,000.00 |
| Asbestos Corp., Can., Ltd., pfd | Can. | 1.75 Q | 70,000.00 |
| Con. Mining & Smelting, Canada | B. C. | 0.625 Q | 263,342.50 |
| Dome Mines, S | Ont. | 0.25 Q | 100,000.00 |
| Hollinger Consol. Gold | Ont. | 0.05 BM | 246,000.00 |
| Howe Sound, c | B. C.—Mex. | 0.05 Q | 99,208.00 |
| Kerr Lake Mines | Ont. | 0.125 K | 75,000.00 |
| Lake Shore Mines, g | Ont. | 0.02 K | 40,000.00 |
| McKinley-Darragh-Savage, Ltd., s | Ont. | 0.05 Q | 67,431,00 |
| N. Y. & Honduras, Rosario, s. g | C. A. | 0.50 QX | 100,000.00 |
| Nipissing Mines, s | Ont. | 0.50 QX | 600,000.00 |

Q, quarterly; X, includes extra; BM, bi-monthly; K, occasional.

Calumet & Hecla Mining, Osceola Consolidated, and Wolverine Copper mining companies all found the metal market too low to justify declaring dividends. Caledonia Mining Co., previously paying monthly dividends, has now changed to quarterly; its last payment was 1c. in July. Daly-West Mining paid on Oct. 1 the quarterly dividend announced in our table for September; Electric Point reflects its prosperity by distributing an extra dividend of 12c. Tonopah-Belmont Development and Tonopah Mining companies both resumed dividends, and Kerr Lake Mines on Oct. 15 broke a silence that had lasted since its capital distribution of September, 1919.

# METAL STATISTICS

## Monthly Average Prices of Metals

### Silver

| | New York | | | London | | |
|---|---|---|---|---|---|---|
| | 1918 | 1919 | 1920 | 1918 | 1919 | 1920 |
| January | 88.702 | 101.125 | 132.827 | 44.356 | 48.438 | 79.846 |
| February | 85.716 | 101.125 | 131.295 | 42.792 | 48.027 | 85.005 |
| March | 88.082 | 101.125 | 125.551 | 43.620 | 48.171 | 74 194 |
| April | 95.346 | 101.125 | 119.779 | 47.215 | 48.886 | 68.848 |
| May | 99 505 | 107.135 | 102.585 | 48.980 | 52.104 | 60 010 |
| June | 99 500 | 110.430 | 90.957 | 48.875 | 53.896 | 51.096 |
| July | 99.625 | 106.394 | 91.971 | 48.813 | 54.133 | 53.736 |
| August | 100.292 | 111.370 | 96.168 | 49.077 | 58.835 | 59 875 |
| September | 101.125 | 114.540 | 93.675 | 49.500 | 61.668 | 93 675 |
| October | 101.125 | 119.192 | 83.480 | 49.500 | 64.049 | 54.197 |
| November | 101.125 | 127.924 | ..... | 48.969 | 70.065 | ..... |
| December | 101.125 | 131.976 | ..... | 48.492 | 76.432 | ..... |
| Year | 96.772 | 111.122 | ..... | 41.516 | 57.059 | ..... |

New York quotations cents per ounce troy, 999 fine. London, pence per ounce, sterling silver, 925 fine.

### Copper

| | New York | | London | | | |
|---|---|---|---|---|---|---|
| | Electrolytic | | Standard | | (b) Electrolytic | |
| | 1919 | 1920 | 1919 | 1920 | 1919 | 1920 |
| January | (a) | 18.918 | 92.238 | 118.095 | 106.619 | 123.238 |
| February | 16.763 | 18.569 | 78.700 | 120.188 | 95.700 | 126.950 |
| March | 14.856 | 18 331 | 76.821 | 109 533 | 82.071 | 118.348 |
| April | 15.246 | 18.660 | 77.300 | 103.025 | 82.200 | 111 500 |
| May | 15.864 | 18.484 | 77.767 | 96.750 | 81.227 | 109.200 |
| June | 17.610 | 18.065 | 83.062 | 87.864 | 85.900 | 101.909 |
| July | 21.604 | 18.576 | 99.576 | 90.148 | 103.046 | 106.455 |
| August | 22.319 | 18.346 | 97.300 | 93.935 | 106.429 | 111.143 |
| September | 21.755 | 18 144 | 100.767 | 96.381 | ..... | 111.905 |
| October | 21.534 | 15.934 | 103.418 | 93.327 | ..... | 104.905 |
| November | 19.758 | ..... | 98.894 | ..... | ..... | ..... |
| December | 18.295 | ..... | 103.708 | ..... | ..... | ..... |
| Year | 18.691 | ..... | 90.796 | ..... | ..... | ..... |

(a) No market. (b) See note on page 927.

### Lead

| | New York | | St. Louis | | London | |
|---|---|---|---|---|---|---|
| | 1919 | 1920 | 1919 | 1920 | 1919 | 1920 |
| January | 5.432 | 8.561 | 5.316 | 8.300 | 37.227 | 47.095 |
| February | 5.057 | 8.814 | 4.784 | 8.601 | 28.675 | 50.256 |
| March | 5.226 | 9.145 | 4.992 | 8.894 | 27.952 | 46.054 |
| April | 4.982 | 8.902 | 4.722 | 8.618 | 24.888 | 39.225 |
| May | 5.018 | 8.576 | 4.773 | 8.352 | 23.852 | 38.488 |
| June | 5.340 | 8.323 | 5.070 | 8.169 | 22.544 | 34.330 |
| July | 5.626 | 8.338 | 5.408 | 8.283 | 23.457 | 34.960 |
| August | 5.798 | 8.687 | 5.583 | 8.725 | 25.330 | 36.304 |
| September | 6.108 | 8.177 | 5.853 | 8 160 | 28.473 | 35.452 |
| October | 6.487 | 7.070 | 6.249 | 7.018 | 34.731 | 35.238 |
| November | 6.808 | ..... | 6.649 | ..... | 41.202 | ..... |
| December | 7.231 | ..... | 6.955 | ..... | .... | ..... |
| Year | 5.759 | ..... | 5.530 | ..... | 28.590 | ..... |

### Tin

| | New York | | | | London | |
|---|---|---|---|---|---|---|
| | 1919 | | 1920 | | | |
| | 99% | Straits | 99% | Straits | 1919 | 1920 |
| January | 67.702 | ..... | 61.596 | ..... | 248.557 | 376.512 |
| February | 66.801 | ..... | 58.466 | 59.932 | 223.963 | 395.750 |
| March | 67.934 | ..... | 61 037 | 61 926 | 236.843 | 369 489 |
| April | 72.500 | ..... | 61.120 | 62 115 | 225.275 | 345.450 |
| May | 72.500 | ..... | 53 230 | 55 100 | 234.398 | 294.813 |
| June | 71 240 | ..... | 46.125 | 48.327 | 238.263 | 250.614 |
| July | 68.000 | ..... | 45.798 | 49.154 | 253.272 | 261.886 |
| August | 57.226 | ..... | 43.856 | 47.620 | 273.625 | 274.048 |
| September | 54.482 | ..... | 41.940 | 44.465 | 280.102 | 270.120 |
| October | 54.377 | ..... | 39.310 | 40.555 | 279.239 | 258.190 |
| November | 53.307 | ..... | ..... | ..... | 283.556 | ..... |
| December | 53.870 | ..... | ..... | ..... | 314.113 | ..... |
| Year | 63.328 | ..... | ..... | ..... | 257.601 | ..... |

### Zinc

| | New York | | St. Louis | | London | |
|---|---|---|---|---|---|---|
| | 1919 | 1920 | 1919 | 1920 | 1919 | 1920 |
| January | 7.272 | 9.483 | 6.922 | 9.133 | 56.045 | 58.643 |
| February | 6.623 | 9.058 | 6.273 | 8.708 | 46.150 | 61.338 |
| March | 6.500 | 8 881 | 6.150 | 8.531 | 38.500 | 53.467 |
| April | 6.465 | 8.534 | 6.114 | 8 184 | 36.118 | 47.388 |
| May | 6.429 | 7.938 | 6.079 | 7 588 | 35.477 | 45.088 |
| June | 6.901 | 7.815 | 6.551 | 7.465 | 36.763 | 41.193 |
| July | 7.873 | 8.070 | 7.523 | 7.720 | 41.815 | 41.886 |
| August | 7.789 | 8.185 | 7.160 | 7 835 | 39.338 | 41 220 |
| September | 7.510 | 7.717 | 7.473 | 7.661 | 40.955 | 39.690 |
| October | 7.823 | ..... | 7.827 | 7.150 | 43.630 | 39.756 |
| November | 8.177 | ..... | 8.350 | ..... | 46.588 | ..... |
| December | 8.700 | ..... | 8.350 | ..... | 53.101 | ..... |
| Year | 7.338 | ..... | 6.988 | ..... | 42.879 | ..... |

New York and St. Louis quotations, cents per pound. London, pounds sterling per long ton.

### Pig Iron, Pittsburgh

| | Bessemer ‡ | | Basic ‡ | | No. 2 Foundry | |
|---|---|---|---|---|---|---|
| | 1919 | 1920 | 1919 | 1920 | 1919 | 1920 |
| January | $33.60 | $40.47 | $31.40 | $39.88 | $32.40 | $39.86 |
| February | 33.60 | 42.95 | 31.40 | 42.61 | 32.40 | 43.40 |
| March | 32.54 | 43 40 | 31.40 | 42 90 | 29.12 | 43.40 |
| April | 29.35 | 43.72 | 27.15 | 44.22 | 28.15 | 43.90 |
| May | 29.35 | 44 00 | 27.15 | 44 88 | 28.15 | 45.36 |
| June | 29.35 | 44.89 | 27.15 | 45 41 | 28.15 | 46.40 |
| July | 29.35 | 47.21 | 27.15 | 47.42 | 28.15 | 46.56 |
| August | 29.35 | 48.90 | 27.15 | 49.88 | 28.15 | 49.35 |
| September | 29.35 | 50.46 | 27.15 | 50.46 | 28.15 | 51.96 |
| October | 29.35 | 49.21 | 27.15 | 44.38 | 28.30 | 48.58 |
| November | 31.60 | ..... | 31.56 | ..... | 32.16 | ..... |
| December | 36.57 | ..... | 35.32 | ..... | 36.86 | ..... |
| Year | $31.11 | ..... | $29.26 | ..... | $28.35 | ..... |

‡ As reported by W. P. Snyder & Co.

**Antimony, New York;** July, 7.500c., August, 7.177c., September, 7.113c., October, 7.725c.

**Quicksilver, New York;** July, $90.333, August, $85.355, September, $75.000, October, $67.200.

## Monthly Copper Production

The crude-copper content of blister copper of the principal producers, in pounds, for June-September, 1920, follows:

MONTHLY CRUDE COPPER PRODUCTION, 1920

| | June | July | August | September |
|---|---|---|---|---|
| Alaska shipments | 7,213,820 | 5,797,645 | 5,762,551 | 1,635,677 |
| Arizona: | | | | |
| Arizona Copper | 3,000,000 | 3,000,000 | 3,000,000 | 3,000,000 |
| Calumet & Arizona | 4764,000 | 4,232,000 | 5,200,000 | 4,292,000 |
| Cons. Ariz. Smelting | 9,40,000 | 750,000 | 975,000 | 950,000 |
| Inspiration | 7,300,000 | 6,500,000 | 7,200,000 | 6,500,000 |
| Magma | 755,601 | 865,774 | 556,760 | 663,219 |
| Miami | 4,400,000 | 4,549,298 | 4,630,725 | 4,549,140 |
| New Cornelia | 3,664,000 | 3,522,000 | 3,842,000 | 3,314,000 |
| Old Dominion | 2,999,000 | 2,640,000 | 2,802,000 | 2,600,000 |
| Phelps Dodge | 6,125,000 | 5,955,000 | 5,875,000 | 6,381,000 |
| Shattuck Arizona | 198,327 | 166,938 | 194,003 | 166,513 |
| Ray | 4,520.000 | 4,500,000 | 4,505,000 | 4,502,000 |
| United Verde | 5,880,000 | 5,085,140 | 5,125,000 | 4,837,000 |
| United Verde Extension | 2,828,020 | 3,304,878 | 5,805,568 | 3,327,644 |
| Michigan: | | | | |
| Calumet & Hecla | 9,022,879 | 8,312,025 | 7,520,107 | 7,278,215 |
| Other Lake Superior | 6,200,000 | 6,200,000 | 6,000,000 | 6,000,000 |
| Montana: | | | | |
| Anaconda | 12,700,000 | 11,700,000 | 11,800,000 | 11,100,000 |
| East Butte | 1,396,140 | 1,537,880 | 1,566,800 | 1,634,260 |
| Nevada: | | | | |
| Nevada Cons | 4,650,000 | 4,650,000 | 4,650,000 | 4,650,000 |
| New Mexico: | | | | |
| Chino | 4,010,069 | 4,360,932 | 4,000,140 | 5,161,894 |
| Utah: | | | | |
| Utah Copper | 10,000,000 | 8,500,000 | 4,820,000 | 8,420,000 |
| Eastern Smelters | 1,600,000 | 1,600,000 | 1,600,000 | 1,600,000 |
| Total reported | 104,166,856 | 97,729,510 | 101,430,654 | 92,562,562 |
| Others, estimated | 12,000,000 | 12,000,000 | 15,000,000 | 13,000,000 |
| Total United States | 116,107,856 | 109,729,510 | 116,430,654 | 105,562,562 |
| Imports: Ore and concentrates, etc | 35,911,009 | 3,937,824 | 11,040,057 | ..... |
| Imports in blister, etc | 15,619,398 | 26,553,600 | 20,320,824 | ..... |
| Grand total | 167,638,263 | 140,220,934 | 147,791,535 | ..... |
| British Columbia: | | | | |
| Granby Cons | 2,079,000 | 2,400,000 | 2,471,200 | 2,239,174 |
| Mexico: | | | | |
| Boleo | 802,474 | 781,613 | 618,390 | 440,720 |
| Cananea | 3,750,000 | 3,500,000 | 3,500,000 | 3,500,000 |
| Phelps Dodge Mexican properties | 1,427,000 | 2,402,000 | 2,490,000 | 1,617,000 |
| Other foreign: | | | | |
| Cerro de Pasco | 3,944,000 | 3,652,000 | 4,440,000 | 4,360,000 |
| Chile | 7,500,000 | 9,904,000 | 10,640,000 | 9,496,000 |
| Katanga | 4,523,221 | ..... | ..... | ..... |
| Backus & Johnston | 1,382,000 | 1,458,000 | 1,580,000 | 1,560,000 |

**Domestic copper production for 1918, 1919, and part of 1920 follows:**

| | 1918 | 1919 | 1920 |
|---|---|---|---|
| January | 165,431,568 | 135,733,511 | 121,903,744 |
| February | 160,011,364 | 111,649,512 | 117,450 000 |
| March | 185,525,168 | 102,040,460 | 120,309,316 |
| April | 163,207,096 | 98,808,998 | 116,078,871 |
| May | 181,070,350 | 92,652,975 | 114,964,207 |
| June | 166,723,599 | 95,856,570 | 116,107,856 |
| July | 159,329,031 | 100,369,247 | 109,729,510 |
| August | 165,550,799 | 107,994,040 | 116,430,654 |
| September | 157,992,487 | 108,703,075 | 105,562,562 |
| October | 168,638,775 | 115,143,143 | ..... |
| November | 159,217,588 | 117,289,735 | ..... |
| December | 161,801,916 | 102 997,633 | ..... |

# MINING STOCKS

## Week Ended October 30, 1920

| Stock | Exch. | High | Low | Last | Last Div. | |
|---|---|---|---|---|---|---|
| **COPPER** | | | | | | |
| Adventure | Boston | .... | .... | *60 | .... | .... |
| Ahmeek | Boston | 55 | 54½ | 54½ | Sept. '20, Q | .50 |
| Alaska-B.C. | N. Y. Curb. | ⅜ | ⅜ | ⅜ | .... | .... |
| Alloues | Boston | 24 | 23¼ | 23¼ | Mar. '19, | 1.00 |
| Anaconda | N. Y. | 51 | 49⅜ | 50½ | Aug. '20, Q | 1.00 |
| Ariz. Com'l | Boston | 9½ | 9 | 9¼ | Oct. '18, | .50 |
| Big Ledge | N. Y. Curb. | ⅜ | ⅜ | ⅜ | .... | .... |
| Bingham Mines | Boston | 9¼ | 9¼ | 9¼ | Sept. '19, Q | .25 |
| Calumet & Ariz. | Boston | 54½ | 3½ | 54 | Sept. '20, Q | 1.00 |
| Calumet & Hecla | Boston | 252 | 24 | 252 | June '20, Q | 5.00 |
| Canada Copper | N. Y. Curb. | .... | .... | ⅛ | .... | .... |
| Centennial | Boston | .... | .... | 9½ | Dec. '18, SA | 1.00 |
| Cerro de Pasco | N. Y. | 39½ | 37⅜ | 38⅜ | Sept. '20, Q | 1.00 |
| Chief Consol. | Boston Curb | 3⅜ | 3⅜ | 3⅜ | Feb. '20, Q | .10 |
| Chile Copper | N. Y. | 14⅛ | 13½ | 13⅞ | .... | .... |
| Chino | N. Y. | 26 | 24⅜ | 26 | Sept. '20, Q | .37½ |
| Columbus Rexall | Salt Lake | *36 | *34 | *35 | .... | .... |
| Con. Ariz. | N. Y. Curb. | .... | .... | ¼ | Dec. '18, Q | .05 |
| Con. Copper M. | N. Y. Curb. | .... | .... | *61 | .... | .... |
| Copper Range | Boston | 34 | 33½ | 33½ | Sept. '20, Q | .50 |
| Crystal Copper | Boston Curb | *70 | *44 | *55 | .... | .... |
| Davis-Daly | Boston | 7½ | 7 | 7 | Mar. '20, Q | .25 |
| East Butte | Boston | 10 | 9½ | 9¾ | Dec. '19, A | .50 |
| First Nat'l | Boston Curb | *90 | *80 | *90 | Feb. '19, SA | .15 |
| Frankl'n | Boston | 2⅜ | 2¼ | 2⅜ | .... | .... |
| Gadsden Copper | N. Y. Curb. | .... | .... | *70 | .... | .... |
| Granby Consol. | N. Y. | 29½ | 28 | 28 | May '19, Q | 1.25 |
| Greene Cananea | N. Y. | 27⅛ | 26½ | 27⅛ | Aug. '20, Q | .50 |
| Hancock | Boston | 4 | 4 | 4 | .... | .... |
| Houghton | Boston Curb | *45 | *45 | *45 | .... | .... |
| Howe Sound | N. Y. Curb. | .... | .... | 1¼ | Oct. '20, Q | .05 |
| Inspiration Con. | N. Y. | 43⅜ | 42⅜ | 42⅜ | Oct. '20, Q | 1.00 |
| Iron Cap | Boston Curb | 8 | 7 | 8 | Sept. '20, K | .25 |
| Isle Royale | Boston | 24 | 24 | 24 | Sept. '19, SA | .50 |
| Kennecott | N. Y. | 23 | 22 | 22½ | Sept. '20 Q | .50 |
| Keweenaw | Boston | 1½ | 1½ | 1½ | .... | .... |
| Lake Copper | Boston | 2⅜ | 2½ | 2½ | .... | .... |
| La Salle | Boston | 2¼ | 2 | 2 | .... | .... |
| Magma Chief | N. Y. Curb. | .... | .... | *21 | .... | .... |
| Magma Copper | N. Y. Curb. | .... | .... | 17 | Jan. '19, Q | .50 |
| Majestic | Boston Curb | *15 | *15 | *15 | .... | .... |
| Mason Valley | Boston | .... | .... | 1⅜ | .... | .... |
| Mass. Con. | Boston | 3½ | 2⅜ | 2⅜ | Nov. '17, Q | 1.00 |
| Mayflower-O.C. | Boston | 4⅜ | 4¼ | 4¼ | .... | .... |
| Miami | N. Y. | 19 | 18½ | 19 | Aug. '20, Q | .50 |
| Michigan | Boston | 3 | 3 | 3 | .... | .... |
| Mohawk | Boston | 56 | 54½ | 55 | Aug. '20, Q | 1.50 |
| Mother Lode (new) | N. Y. Curb. | 5⅞ | 5⅜ | 5⅜ | .... | .... |
| Nevada Con. | N. Y. | 11½ | 10⅞ | 11½ | Sept. '20, Q | .25 |
| New Arcadian | Boston | .... | .... | 2½ | .... | .... |
| New Baltic | Boston Curb | .... | .... | 3 | .... | .... |
| New Cornelia | Boston | 18¼ | 17½ | 17½ | Aug. '20, | .25 |
| Nixon Nev. | N. Y. Curb. | .... | .... | *9 | .... | .... |
| North Butte | Boston | 14¼ | 13¾ | 14¼ | Oct. '18, Q | .25 |
| North Lake | Boston | .... | .... | *25 | .... | .... |
| Ohio Copper | N. Y Curb. | .... | .... | 1/16 | .... | .... |
| Oiibway | Boston | .... | .... | 1⅜ | .... | .... |
| Old Dominion | Boston | 22½ | 22½ | 22½ | Dec. '18, Q | 1.00 |
| Osceola | Boston | 32 | 30 | 30 | June '20, Q | .50 |
| Phelps Dodge | Open Mar. | †190 | †170 | .... | Oct. '20, Q | 2.50 |
| Quincy | Boston | 42 | 41 | 41 | Sept. '20, Q | 1.00 |
| Ray Con. | N. Y. | 14⅛ | 13⅜ | 14⅛ | June '20, Q | .25 |
| Ray Hercules | Boston Curb | .... | .... | *50 | .... | .... |
| St. Mary's M. L. | Boston | 35⅜ | 35 | 35 | June '20, K | 2.00 |
| Seneca | Boston | 19 | 17½ | 19 | .... | .... |
| Shannon | Boston | 1½ | 1 1/16 | 1½ | Nov. '17, Q | .25 |
| Shattuck Ariz. | N Y | 7⅜ | 7¼ | 7⅜ | Jan. '20 Q | .25 |
| South Lake | Boston | .... | .... | 2 | .... | .... |
| South Utah | Boston | *9 | *6 | *6 | .... | .... |
| Superior Copper | Boston | 4 | 4 | 4 | Apr. '17, | 1.00 |
| Superior & Boston | Boston | 3 | 2 1/16 | 3 | .... | .... |
| Tenn. C. & C | N. Y. | 9⅜ | 9¼ | 9¼ | May '18, I | 1.00 |
| Tuolumne | Boston | *55 | *47 | *53 | May '13, | .10 |
| United Verde Ex. | Boston Curb | *29½ | *29 | *29 | Aug. '20, Q | .50 |
| Utah Con. | Boston | 5⅜ | 4 | 4 | Sept. '18, | .25 |
| Utah Copper | N. Y. | 58⅛ | 56¼ | 58⅛ | Sept. '20, Q | 1.50 |
| Utah M. & T. | Boston | 1 1/16 | 1 1/16 | 1 1/16 | Dec. '17, | .30 |
| Victoria | Boston | 2 | 1½ | 1⅞ | .... | .... |
| Winona | Boston | *35 | *30 | *30 | .... | .... |
| Wolverine | Boston | 11½ | 10 | 11 | Jan. '20, Q | .50 |
| **LEAD** | | | | | | |
| Hecla Mining | N. Y. Curb. | 4⅛ | 4⅛ | 4⅛ | Sept '20, QX | .15 |
| St. Joseph Lead | N. Y. | 14⅛ | 14⅛ | 14⅛ | Sept '20, QX | .50 |
| Stewart | Boston Curb | .... | .... | *13 | Dec. '15, | .05 |
| Utah Apex | Boston | 2½ | 3 | 3⅛ | Nov. '18, | .25 |
| **ZINC** | | | | | | |
| Am. Z. L. & S. | N. Y. | 11½ | 10 | 10 | May '17, | 1.00 |
| Am. Z. L. & S pf. | N. Y. | 43 | 40 | 40 | Aug. '20, Q | 1.50 |
| Butte C. & Z. | N. Y. | 7 | 6⅛ | 7 | June 18, I | .50 |
| Butte & Superior | N. Y. | 16½ | 15½ | 15½ | Sept. '17, | 1.25 |
| Con. Interst. Cal. | N. Y. | 8⅛ | 7⅜ | 7⅜ | June '20, Q | .50 |
| New Jersey Z. | N. Y. Curb. | .... | .... | 169 | Aug. '20, Q | 4.00 |
| Success | N. Y. Curb. | 3 | 2½ | 3 | July '16, | .03 |
| Yellow Pine | Los Angeles | *90 | *90 | *90 | June '20, Q | .03 |

*Cents per share. †Bid or asked. ‡Quotations missing. Q, Quarterly. SA, Semi-annually. BM, bimonthly. K, Irregular. I, Initial X, includes extra.

| Stock | Exch. | High | Low | Last | Last Div. | |
|---|---|---|---|---|---|---|
| **GOLD** | | | | | | |
| Alaska Gold | N. Y. | 1⅜ | 1⅜ | 1⅜ | .... | .... |
| Alaska Juneau | N. Y. | 2 | 1⅜ | 1⅜ | .... | .... |
| Carson Hill | N. Y. Curb. | .... | .... | 22⅜ | .... | .... |
| Cresson Consol. G. | N. Y. Curb. | 1⅜ | 1 | 1⅜ | June '20, Q | .10 |
| Dome Ex. | Toronto | *43 | *42 | *42½ | .... | .... |
| Dome Mines | N. Y. | 11⅜ | 11⅛ | 11⅛ | Oct '20, Q | .25 |
| Golden Cycle | Colo. Sprgs. | ‡.... | .... | *73 | Sept. '20, Q | .02 |
| Goldfield Con. | N. Y. Curb. | *10 | *8½ | *9½ | Dec. '19, | .05 |
| Hedley | Boston | .... | .... | 4½ | June '19, | .10 |
| Hollinger Con. | Toronto | 5.65 | 5.50 | 5.55 | Oct. '20, BM | .05 |
| Homestake | N. Y. | .... | .... | 45 | Sept. '19, | .50 |
| Kirkland Lake | Toronto | *42 | *42 | *42 | .... | .... |
| Lake Shore | Toronto | 1.05 | 1.05 | 1.05 | Oct. '20, K | .02 |
| McIntyre-Porcupine | Toronto | 2.01 | 1.94 | 1.94 | Sept. '20, K | .05 |
| Porcupine Crown | Toronto | *23 | *23 | *23 | July '17, | .03 |
| Portland | Colo. Sprgs. | ‡.... | .... | *60 | Oct. '20, Q | .01¼ |
| Reorgan. Booth | N. Y. Curb. | *5 | *4 | *5 | May '19, | .05 |
| Silver Pick | N. Y. Curb. | *7 | *5 | *5 | .... | .... |
| Teck Hughes | Toronto | .... | .... | *8½ | .... | .... |
| Tom Reed | Los Angeles | 1.49 | 1.44 | 1.44 | Dec. '19, | .02 |
| United Eastern | N. Y. Curb. | 2⅜ | 2⅛ | 2 1/16 | Oct. '20, Q | .15 |
| Vindicator Consol. | Colo. Sprgs. | ‡.... | .... | *18 | Jan. '20, Q | .01 |
| West Dome Consol. | Toronto | *⅜ | *5½ | *5½ | .... | .... |
| White Caps Min. | N. Y. Curb. | *9 | *7½ | *8 | .... | .... |
| Yukon Gold | Boston Curb | 1½ | 1⅜ | 1⅜ | June '18, | .02½ |
| **SILVER** | | | | | | |
| Arizona Silver | Boston Curb | *24 | *17 | *20 | Apr '20, M | .03 |
| Beaver Con. | Toronto | *38 | *37½ | *37½ | May '20, K | .03 |
| Coniagas | Toronto | 2.37 | 2.37 | 2.37 | Aug. '20, Q | .12½ |
| Crown Reserve | Toronto | *20 | *20 | *20 | Jan. '17, | .05 |
| Kerr Lake | Boston | 3½ | 3½ | 3½ | Oct. '20, K | .12½ |
| La Rose | Toronto | *30 | *30 | *30 | Apr. '18, | .02 |
| McKinley-Dar. | Toronto | .... | .... | *50 | Oct. '20, Q | .03 |
| Mining Corp. | Toronto | 1.75 | 1.70 | 1.75 | Sept. '20 Q | .12½ |
| Nipissing | N. Y. Curb. | 9 | 8⅜ | 8⅜ | Oct. '20, QX | .50 |
| Ontario Silver | N. Y. | .... | .... | 5 | Jan. '19, Q | .50 |
| Ophir Silver | N. Y. Curb. | 1 1/16 | 1 1/16 | ⅜ | Jan. '12, | .10 |
| Peterson Lake | Toronto | *11⅜ | *11⅛ | *11⅛ | Jan. '17, | .01½ |
| Temiskaming | Toronto | .... | .... | *32 | Jan. '20, K | .04 |
| Trethewey | Toronto | *27½ | *24 | *25 | Jan. '19, | .05 |
| **GOLD AND SILVER** | | | | | | |
| Atlanta | N. Y. Curb. | *1⅛ | *1 | *1⅛ | .... | .... |
| Barnes-King | Butte | ‡.... | .... | 1.11 | Aug. '20, Q | .05 |
| Bost. & Mont. | Boston | .... | .... | *63 | .... | .... |
| Cashboy | N. Y. Curb. | *7 | *5 | *6 | .... | .... |
| El Salvador | N. Y. Curb. | ⅜ | ⅜ | ⅜ | .... | .... |
| Jim Butler | N. Y. Curb. | *19 | *16 | *18 | Aug. '18, SA | .07 |
| Jumbo Extension | N. Y. Curb. | *7 | *5 | *6 | June '16, | .05 |
| Louisiana Con. | N. Y. Curb. | .... | .... | 1/16 | .... | .... |
| MacNamara M. | N. Y. Curb. | 1/16 | 1/16 | 1/16 | May '10, | .02½ |
| N.Y. Hond. Rosar | Open Mar. | †12 | †10⅛ | .... | Oct. '20, QX | .50 |
| Tonopah-Belmont | N. Y. Curb. | 1⅛ | 1 1/16 | 1⅛ | Oct. '20, Q | .05 |
| Tonopah-Divide | N. Y. Curb. | 1⅛ | 1⅛ | 1 1/16 | .... | .... |
| Tonopah Ex. | N. Y. Curb. | 1⅛ | 1 | 1⅛ | Oct. '20, Q | .05 |
| Tonopah Mining | N. Y. Curb. | 1⅛ | 1⅛ | 1 1/16 | Oct. '20, SA | .05 |
| West End Con. | N. Y. Curb. | 1⅛ | 1 | 1 1/16 | Dec. '19 SA | .05 |
| **SILVER-LEAD** | | | | | | |
| Caledonia | N. Y. Curb. | *19 | *17 | *18 | July, '20, M | .01 |
| Consol. M. & S. | Montreal | 23 | 22 | 23 | Oct. '20, Q | .62½ |
| Daly Mining | Salt Lake | 2.40 | 2.40 | 2.40 | July '20, Q | .10 |
| Daly-West | Boston | 4½ | 4½ | 4½ | Oct. '20, Q | .25 |
| Eagle & Blue Bell | Boston Curb | 2½ | 2 1/16 | 2 1/16 | Apr. '20, Q | .10 |
| Electric Point | Spokane | *14½ | *14 | *14½ | May '20, SA | .03 |
| Fed. M. & S. | N. Y. | 10 | 10 | 10 | Jan. '09, | 1.50 |
| Fed M. & S. pf. | N. Y. | 31⅞ | 31⅛ | 31⅛ | Sept. '20, Q | 1.75 |
| Florence Silver | Spokane | *25 | *25 | *25 | Apr. '19, | .01½ |
| Grand Central | Salt Lake | .... | .... | *37½ | June '20, K | .03 |
| Iron Blossom | N. Y. Curb. | *25 | *25 | *25 | Apr. '20, Q | .02½ |
| Judge M. & S. | Salt Lake | 3.90 | 3.82½ | 3.82½ | Sept. '20, Q | .12½ |
| Marsh Mines | N Y Curb. | *11½ | *10 | *11 | .... | .... |
| Prince Consol. | N Y Curb. | *25 | *14 | *25 | Nov. '17, | .02½ |
| Rambler-Cariboo | Spokane | *8 | *6 | *8 | Feb. '19, | .01 |
| Rex Con. | N Y Curb | *6 | *5 | *6 | .... | .... |
| South Heela | Salt Lake | .... | .... | *85 | Sept. '19, K | .15 |
| Stand. S. L. | N Y Curb | 1/16 | 1/16 | 1/16 | Oct '17, | .05 |
| Tamarack-Custer | Spokane | 2.20 | 2.20 | 2.20 | Dec. '19, K | .03 |
| Tintic Standard | Salt Lake | 3.02½ | 2.92½ | 3.00 | June '20, Q | .10 |
| Wilbert Mining | N Y Curb | *4¼ | *3½ | *4 | Nov. '17, | .01 |
| **NICKEL-COPPER** | | | | | | |
| Internat'l Nickel | N. Y. | 18 | 17½ | 17½ | Mar. '19, | .50 |
| Internat'l Nick.pf | N. Y. | 83 | 83 | 83 | Aug. '20, Q | 1.50 |
| **QUICKSILVER** | | | | | | |
| New Idria | Boston | .... | .... | 5 | Jan. '19, | .25 |
| **TUNGSTEN** | | | | | | |
| Mojave Tungsten | Boston Curb | *10 | *5 | *5 | .... | .... |
| **VANADIUM** | | | | | | |
| Vanadium Corp. | N. Y. | 65⅜ | 61¼ | 63⅛ | Oct. '20, Q | 1.50 |
| **ASBESTOS** | | | | | | |
| Asbestos Corp. | Montreal | 94 | 88 | 91 | Oct. '20, Q | 1.50 |
| Asbestos Corp. pf. | Montreal | 100 | 98 | 98 | Oct. '20, Q | 1.75 |
| **MINING, SMELTING AND REFINING** | | | | | | |
| Am. S. & R. | N. Y. | 60¼ | 57⅛ | 60⅛ | Sept. '20, Q | 1.00 |
| Am. S. & R.pf. | N. Y. | 91 | 90¼ | 91 | Sept. '20, Q | 1.75 |
| Am. Sm. pf.A | N. Y. | 78 | 77 | 77 | Oct. '20, Q | 1.50 |
| U. S. Sm. R. & M. | N. Y. | 55 | 52⅜ | 54 | Oct. '20, Q | 1.50 |
| U.S.S.R.& M. pf. | Boston | 44¼ | 43½ | 43⅜ | Oct. '20, Q | .87½ |

# INDUSTRIAL NEWS

## New Type of Air Drill Perfected

### Said To Be Simple in Construction and Light of Weight

The development of pneumatic mining and quarrying tools has been so rapid, and their performance latterly so efficient, that it is but natural they should now be regarded as having reached such a state of perfection that radical changes or improvements are, generally speaking, no longer expected.

And yet, notwithstanding this popular notion, The Denver Rock Drill Manufacturing Co., which has for quite a number of years been in the forefront of rock drill progress, has recently developed a new type of light mining and quarrying drill which, it is claimed, marks an advance in the progress of air drill manufacture.

This new type of drill is built in three models, known respectively as Models NA-90, NRW-93 and NRD-95; the first named being a "dry" auger drill, specially designed for work in coal, iron and other soft formations; the second, a combination "wet" and "dry" rock drill efficiently serviceable in all kinds of rock and under all conditions, either above or below ground; and the last named, a "dry" rock drill particularly adapted to work in wet shafts or where out-of-door conditions prevail.

All three drills are quite light, can be easily carried about, and each requires but one man to operate it. They are built throughout of the very best steels compounded and with the utmost precision. While most Waugh drills are of the valveless type, the "Nineties" are equipped with an entirely new type of spool valve, having a positive efficient action. The rotation mechanism is of exceptionally strong design in which stresses in both teeth and pawls are reduced to a minimum. Lubrication is effected by pulsations of air which gradually feed the oil from a reservoir at the side of the cylinder into all parts of the machine.

## Motor Trucks and Future Plans

Leo L. Robinson, chief of the Transportation Section of the Council of National Defense, contributes to *The Commercial Car Journal*, where he says, in part: "Records of the Highways Transport Committee of the Council of National Defense not only furnish concrete evidence of the number and character of transportation crises which may develop, but suggest methods for remedying many of them. These methods suggest first the greater utilization of the highway and its twin agency, the motor truck, as potential mediums for emergency service, as well as for that day-to-day performance upon which plans for the future may be built."

## Advertising in the Vernacular Brought Trade

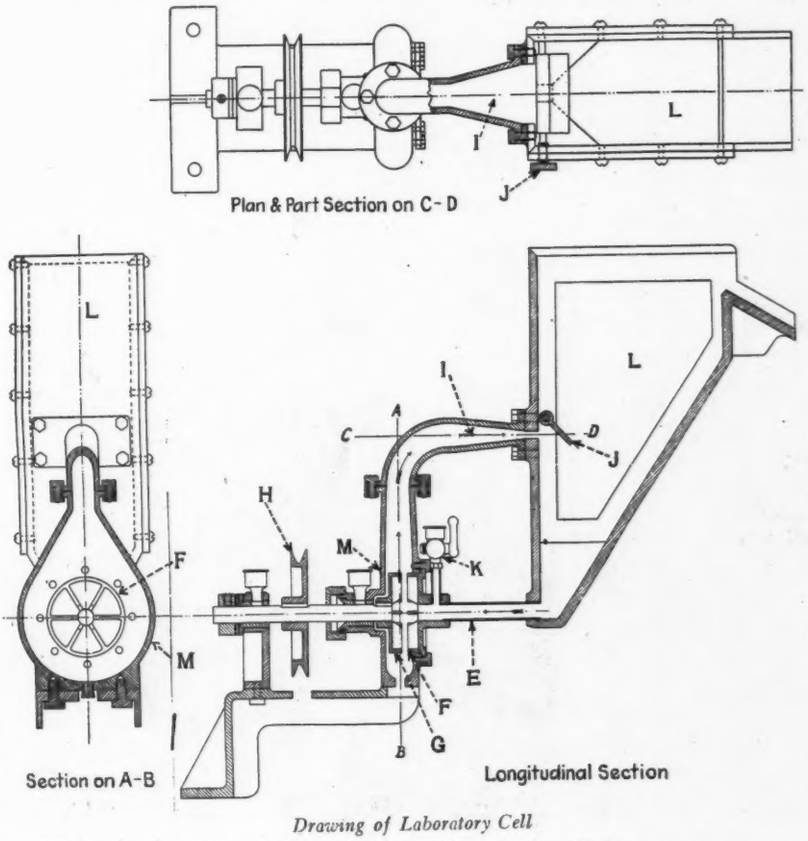
Major H. A. Chisholm, Canadian Trade Commissioner in Havana, Cuba, reports that previous to this year Cuba bought her building plaster from the United States. Firms in New Brunswick and Nova Scotia shipped crude gypsum to the United States. It was there manufactured into building plaster and shipped to Cuba, but now Nova Scotia and New Brunswick firms are shipping building plaster direct to Cuba. One Nova Scotia company recently received an order for 60,000 barrels of building plaster from Cuba. This latter firm advertised extensively in Spanish. The Canadian government trade commissioner in Cuba has interested himself in an endeavor to divert this trade into Canadian channels.

**Water Screens.**—The Link-Belt Company, 910 South Michigan Avenue, Chicago, recently published an illustrated twenty-four page book covering its traveling water screens.

## Colburn Flotation Machine Gives Agitation at Low Pressure

The Colburn vacuum flotation process comprises a flotation machine of the multi-cell type through which the pulp flows from cell to cell. The pulp is first received in a compartment connected with the vacuum inlet of the first agitator, and this discharges against a baffle in the spitzkasten of the first compartment. The froth rises to the surface, where it overflows over a baffle to the concentrates launder. The portion of the pulp which settles to the bottom of the spitzkasten chamber is drawn into the second agitator and discharged into the next spitzkasten, and so on throughout the series. Discharge level is maintained by a baffle at the end of the machine and by openings between the cells.

The agitator consists of two plates, one stationary and the other rapidly rotated. The interior construction of the plates is identical, except that the stationary plate is provided with an inlet at the center. The interior of each plate is provided with twelve radial baffles, which are alternately long and short as shown in Fig. 2. The plates are adjustable, and the width of the




*Drawing of Laboratory Cell*

E Suction
M Agitator
F Stator or stationary plate
G Rotor or revolving plate
J Adjustable Baffle
K Air and oil valve
H Pulley
I Discharge
L Spitzkasten

FIG. 1. SECTIONS OF THE COLBURN LABORATORY FLOTATION MACHINE

peripheral discharge is approximately ¹⁄₃₂ in. The inlet to the stationary plate is of smaller diameter than the outlet of the agitator. The outlet of the agitator is flattened so as to discharge a thin, sheet-like stream against the baffle in the spitzkasten. The sectional view of the laboratory machine, shown in Fig. 1, makes this clear.

Connected with the suction inlets are vertical pipes which terminate in small valves placed well above the pulp level in the machine. By regulating the opening of these valves, any desired vacuum within somewhat less than ¹⁄₂ to ³⁄₄ the maximum can be obtained. The rotating plate is speeded to between 1,200 and 1,300 r.p.m. in the 50-ton commercial machine. A 10-hp. motor is used on this machine, but actual figures on power consumption are not available. Pulp flow is due to the regular flow of pulp through the machine and is induced or accelerated by the action of the agitator. It is evident from the construction of the plates and the high speed of rotation that there is intense agitation under a low vacuum in the chamber between the plates. The regulation of the amount of vacuum is readily accomplished and enables the size of the bubbles and the degree of flotation to be adjusted with greater precision than hitherto.

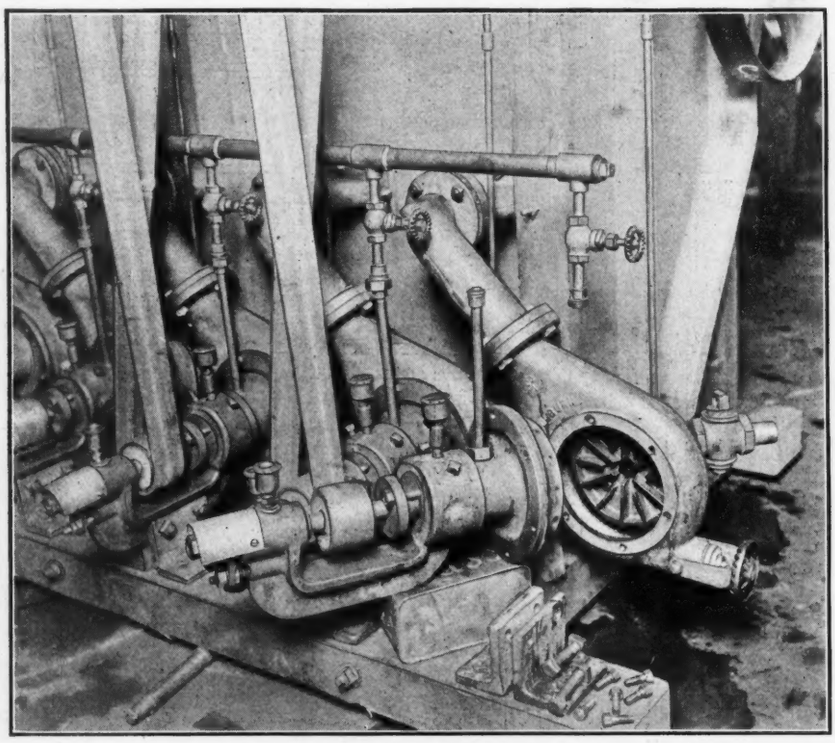


FIG. 2. GENERAL VIEW OF COLBURN VACUUM FLOTATION MACHINE

It appears that the machine has considerable promise in the field of differential flotation as well as in the flotation of certain ores which have yielded only indifferent results when experimentally tested by flotation under other conditions. Several machines have been installed, and at present a single unit is being placed in the mill of the Leadville Mines Co., Washoe County, Nev. The results of these installations should be of considerable interest to those interested in flotation.

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**The Armstead Snow Motors Co.,** Talache, Idaho, of which H. H. Armstead is president and H. W. Sanders is secretary, anounces that it has effected co-operation with the Premier Motors factory, Indianapolis, Ind., for the construction, in quantity, of snow motors (an automobile which functions on any depth of snow). This machine was thoroughly tested out last winter on the road between Klockmann and Porthill, Idaho, by hauling concentrates from the Idaho-Continental mine. Mining and mechanical engineers, who have seen the car operate, say that Major Armstead has solved the winter transportation problem; and the manufacture of snow motors at the Premier factory, Indianapolis, will be one of the growing new industries of the United States. Next year the Armstead Snow Motors Co. expects to manufacture also in Canada and Russia.

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**The Chicago Chapter of the American Welding Society** has issued a pamphlet "Keep the Guess Work Out of Welding." Copies of this booklet may be had by addressing the secretary of The American Welding Society, 608 South Dearborn St., Chicago, Ill.

**The executive committee of this society (New York) has recommended forming a New York Section to operate separately from the parent organization.**

## TRADE CATALOGS

**Screens**—The W. S. Tyler Co., of Cleveland, Ohio has issued an attractive catalogue descriptive of the Hummer inclined screen. Unlike any other screen, the vibration is produced by electro-magnets and is applied directly to a drumhead tension screening surface. The intensity of vibration can be regulated easily by turning a small hand wheel at the top of the vibrator. The mechanism is placed on top of the screen, out of the way of the falling material. Screens of this type will no doubt find extended application, as they represent a marked advance over the old and slower methods of mechanical vibration.

**Conveyors**—Portable Machinery Co., Passaic, N. J., has issued a twenty-four-page catalog entitled "Portable Conveyors." This is complete with illustrations showing the various uses of the scoop conveyor and other portable conveyors manufactured by the company, and describes the labor, time-, and money-saving features of the machine in storing, reclaiming, loading, and unloading material, such as coal, coke, ashes, sand, gravel, crushed stone, fertilizer, cement, and chemicals. Copies will be sent free on request.

**Ventilating; Heating**—Buffalo Forge Co., Buffalo, N. Y., has published a very useful illustrated catalog of 115 pages, well arranged, on its fan system of heating and ventilating. Much space is devoted to the principles and the methods of check and control of air conditioning. Part III, or but eighteen pages of the whole, is devoted to the apparatus in particular. The numerous tables, graphs, and formulas of this catalog, No. 700, make it one of the most helpful issued on the subject.

**Wood Pipe**—Continental Pipe Mfg. Co., Seattle, Wash., recently issued Bulletin No. 16, "Continental Creo-Wood Flume," which describes the several features of that product. It is stated that this type of flume will carry more water for a given diameter than any other, preserves its semicircular shape, permits of reasonably sharp curvature, will not crack, disintegrate, or rust, and will not expand in hot weather nor contract in cold. Several installations are illustrated.

**Sectional Buildings**—The Steel Fabricating Corporation, Harvey, Ill., is distributing a large illustrated folder showing the many uses for sectional steel buildings and their economy. The illustrations suggest many ways in which these handy and easily moved structures could serve the mining and quarrying industries, a subject specially interesting to the corporation's free advisory service. A catolog will be sent any applicant who submits particulars of his needs.